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BULLETIN OF THE NEW YORK ACADEMY OF MEDICINE

VOL. IV.

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No. 1

ANNIVERSARY DISCOURSE BODY AND MIND

JOHN DEWEY

(Delivered before The New York Academy of Medicine, November 17, 1927)

You will not be surprised to hear that when your president, Dr. Lambert, did me the honor to ask me to address you this evening my thoughts turned to the general theme of the relations of philosophy and medicine before settling on a special topic. I was thus led to recall the beginning of both of them in Greece and to the fact that there was a time when philosophy, science and the arts, medicine included, were much closer together than they have been since. For both philosophy and the sciences were conceived and begotten of the arts. It was once their aspiration to find their issue in arts; the sciences in arts of the special branches of life and philosophy in the comprehensive art of the wise conduct of life as a whole.

There is a contemporary philosophic movement, popularly known as pragmatism, which, discontented with the current separation of theory and practise, knowledge and action, regards thought and the beliefs which proceed from it as themselves modes of action and strives to envisage them in their directive office in conduct. This movement is often regarded as a heresy, indeed as a novel and peculiarly American heresy indicative of an insensate love of keeping busy, no matter how. But in truth it marks a return to the idea of philosophy which prevailed when reflective thought was young and lusty, eager to engage in combat in the public arena, instead of living a sheltered

and protected life. In those days science and philosophy had not parted ways because neither of them was cut loose from the arts. One word designated both science and art: *technē*. The desire was to command practices that were rational and a reason embodied in practise. During the almost countless ages of prior human history men had pursued the arts thoughtlessly, relying upon the bare accumulation of accidental successes, without paying heed to causes and reasons. In consequence, the arts were routines, devoted to separate ends and meeting only in a common medium of magic and supernatural belief.

The Greeks define an epoch in the history of civilization because they turned back to examine these routines and accidents, and made it their business to discover the principles which underlay them in order that they might reincarnate them in a more intelligent pursuit of ends. In liberating the arts from routine and blind accumulation, they gave birth to science; in view of this achievement there arose the idea of an art of life based upon the most comprehensive insight into the relationships between conditions and ends. Medicine was one of the first-fruits of the scientific emancipation, and, since the Greeks recognized the necessity of a sound mind in a sound body for the conduct of life in its wholesomeness, medicine and philosophy were in close alliance.

The relevant facts are exhibited in the history of the school of Hippocrates. Philosophy appears in it as search for a whole which shall bind together a mass of otherwise disconnected details: while the spirit of science was operative in a loving, patient and prolonged search for facts and their significance, and the medical art was the use of the knowledge and insight thus attained. The union of these three things is seen in the school's glorification of *technē*; in its criticism of other schools of physicians for studying symptoms in isolation and multiplying diseases and remedies: in its emphasis upon prognosis by which was meant not just a prediction of outcome but a reconstruction of the entire course of a disease; in study of health and disease in relation to environment, climate, seasons and seasonal variations, air, water and soil, while the oath of Hippocrates endures as evidence that human and social ties were included in the wide and searching vision. What at first

sight may seem to be an attack upon mingling philosophy and medicine turns out upon closer inspection to be an attack upon basing medicine upon a narrow philosophical foundation. For the school, borrowing from Heracleitus, Empedocles and Pythagoras, insisted upon the measured harmony of all elements as the conditions of maintaining and restoring health. As Hippocrates said: "We cannot understand the body without a knowledge of the whole of things." And again, speaking of epilepsy and other disorders regarded as sacred and hence treated by means of magical incantations, he said: "These maladies, like all other things, are divine, and yet no one thing is any more divine than another. For all things alike are divine and yet each one of them has its own natural being and proceeds from a natural cause."

We may indeed now smile at the crudeness of their philosophy and science and in view of this crudeness be led to deplore the connection of philosophy, science and medical art. The disparagement of the union may readily become more pronounced when we consider the later development of various medical schools, the dogmatic, empirical, methodistic and pneumatistic, each allied with a particular school of philosophic thought. But objection is really directed against the crude state of knowledge and culture at the time, a state of which both philosophy and medicine were victims. The philosophic spirit at least kept alive the sense of need for general principles and aided in preventing relapse into the earlier crude empiricism.

This introduction is overlong, and may indeed not seem to be at all an introduction to the special topic of the evening, the relations of body and mind. But it was in the course of such reflections that I was led to this topic as a fitting theme. For the conspicuous trait of the period in which science, philosophy and the arts were closely connected was the sense of wholeness, while the very problem of mind and body suggests the disastrous effect of the divisions that have since grown up. I do not know of anything so disastrously affected by the tradition of separation and isolation as is this particular theme of body-mind. In its discussion are reflected the splitting off from each other of religion, morals and science; the divorce of philosophy from science and of both from the arts of conduct.

The evils which we suffer in education, in religion—for example the fundamentalist attack about the evolution of men rests upon the idea of complete separation of mind and body—in the materialism of business and the aloofness of “intellectuals” from life, the whole separation of knowledge and practise:—all testify to the necessity of seeing mind-body as an integral whole.

The division in question is so deep-seated that it has affected even our language. We have no word by which to name mind-body in a unified wholeness of operation. For if we said “human life” few would recognize that it is precisely the unity of mind and body in action to which we were referring. Consequently when we discuss the matter, when we talk of the relations of mind *and* body and endeavor to establish their unity in human conduct, we still speak of body *and* mind and thus unconsciously perpetuate the very division we are striving to deny. I shall make no attempt to consider all the various theories which have developed in discussing their relation: panpsychism, epiphenomenalism, pre-established harmony, interactionism, parallelism, etc. I shall not even try to prove their unity. I shall beg that question and devote the time to stating the nature of the unity and considering some of the causes which work against recognition of it.

I have used, in passing, the phrases “wholeness of operation,” “unity in action.” What is implied in them gives the key to the discussion. In just the degree in which action, behavior, is made central, the traditional barriers between mind and body break down and dissolve. Were this the fit time and place, it could be shown, I think, that the habit of regarding the mental and physical as separate things has its roots in regarding them as substances or processes instead of as functions and qualities of action. In contrast to such a notion, it is asserted that when we take the standpoint of human action, of life in operation, body presents itself as the mechanism, the instrumentality of behavior, and mind as its function, its fruit and consummation. To the interpretation of this statement our further remarks are given.

When we take the standpoint of action we may still treat some functions as primarily physical and others as primarily mental. Thus we think of, say, digestion, reproduction and

locomotion as conspicuously physical, while thinking, desiring, hoping, loving, fearing are distinctively mental. Yet if we are wise we shall not regard the difference as other than one of degree and emphasis. If we go beyond this and draw a sharp line between them, consigning one set to body exclusively and the other to mind exclusively we are at once confronted by undeniable facts. The being who eats and digests is also the one who at the same time is sorrowing and rejoicing; it is a commonplace that he eats and digests in one way to one effect when glad, and in another when he is sad. Eating is also a social act and the emotional temper of the festal board enters into the alleged merely physical function of digestion. Eating of bread and drinking of wine have indeed become so integrated with the mental attitudes of multitudes of persons that they have assumed a sacramental spiritual aspect. There is no need to pursue this line of thought to other functions which are sometimes termed exclusively physical. The case of taking and assimilating food is typical. It is an act in which means employed are physical, while the quality of the act determined by its consequences is also mental. The trouble is that instead of taking the act in its entirety we cite the multitude of relevant facts only as evidence of influence of mind on body and of body on mind, thus starting from and perpetuating the idea of their independence and separation even when dealing with their connection. What the facts testify to is not an influence exercised across and between two separate things, but to behavior so integrated that it is artificial to split it up into two things.

The more human mankind becomes, the more civilized it is, the less is there some behavior which is purely physical and some other purely mental. So true is this statement that we may use the amount of distance which separates them in our society as a test of the lack of human development in that community. There exists in present society, especially in industry, a large amount of activity that is almost exclusively mechanical; that is carried on with a minimum of thought and of accompanying emotion. There is a large amount of activity especially in "intellectual" and "religious" groups in which the physical factor is at a minimum and what little there is is regretted as a deplorable necessity. But either sort of behavior in the degree

of its one-sidedness marks a degradation, an acquired habit whose formation is due to undesirable conditions; each marks an approximation to the pathological, a departure from that wholeness which is health. When behavior is reduced to a purely physical level and a person becomes like a part of the machine he operates, there is proof of social maladjustment. This is reflected into disordered and defective habits of the persons who act on the merely physical plane.

Action does not cease to be abnormal because it is said to be spiritual and concerned with ideal matters too refined to be infected with the gross matter. Nor is it enough that we should recognize the part played by brain and nervous system in making our highly intellectual and "spiritual" activities possible. It is equally important that we realize that the latter are truncated and tend toward abnormality in the degree that they do not eventuate in employing and directing physical instrumentalities to effect material changes. Otherwise that which is called spiritual is in effect but indulgence in idle phantasy.

Thus the question of the integration of mind-body in action is the most practical of all questions we can ask of our civilization. It is not just a speculative question; it is a demand: a demand that the labor of multitudes now too predominantly physical in character be inspirited by purpose and emotion and informed by knowledge and understanding. It is a demand that what now pass for highly intellectual and spiritual functions shall be integrated with the ultimate conditions and means of all achievement, namely the physical, and thereby accomplish something beyond themselves. Until this integration is effected in the only place where it can be carried out, in action itself, we shall continue to live in a society in which a soulless and heartless materialism is compensated for by soulful but futile and unnatural idealism and spiritualism. For materialism is not a theory, but a condition of action; that in which material and mechanical means are severed from the consequences which give them meaning and value. And spiritualistic idealism is not a theory but a state of action; that in which ends are privately enjoyed in isolation from means of execution and consequent public betterment.

In insisting upon the need of viewing action in its integrated wholeness, the need of discriminating between different qualities of behavior due to the mode of integration is emphasized, not slurred. We need to distinguish between action that is routine and action alive with purpose and desire; between that which is cold, and as we significantly say inhuman, and that which is warm and sympathetic; between that which marks a withdrawal from the conditions of the present and a retrogression to split off conditions of the past and that which faces actualities; between that which is expansive and developing because including what is new and varying and that which applies only to the uniform and repetitious; between that which is bestial and that which is godlike in its humanity; between that which is spasmodic and centrifugal, dispersive and dissipating, and that which is centred and consecutive. Until we can make such distinctions and make them in a multitude of shades and degrees, we shall not be able to understand the conduct of individuals, and not understanding, shall not be able to help them in the management of their lives. Because of this lack, education will be a guess in the dark; business a gamble in shifting about and circulating material commodities, and politics an intrigue in manipulation. What most stands in the way of our achieving a working technique for making such discriminations and employing them in the guidance of the actions of those who stand in need of assistance is our habitual splitting up the qualities of action into two disjoined things.

It is necessary, however, to be explicit upon what is meant by saying that within the unity of behavior body stands for the means and agencies of conduct, and mind for its incorporated fruits and consequences. The bodily phase of action may be approached and studied in two ways. We may take it in its connection with processes which are going on outside the body, the processes which it shares with inanimate things. Or we may take it in connection with what it actually does and effects in the distinctively human medium. The first mode of approach views action in all its modes as a variegated complex of physico-chemical interactions. This kind of study is more than legitimate; it is indispensable. If organic changes are regarded as something unique, cut off from and unlike in kind to those occurring

in inanimate nature, we cannot understand them, and therefore cannot direct and modify the manner of their taking place. Only when we identify them with events in inanimate nature does our knowledge in physics and chemistry become available for knowing them; only then do the appliances and techniques that we have developed for control of affairs outside the body become adaptable for use in dealing with what goes on within the body. As long as organic processes and changes are connected with any unique, non-physical force or principle, our knowledge of them is rudimentary and accidental. When they are seen to be shared with processes going on in inanimate nature, all that is discovered about the latter becomes an intellectual tool for systematic knowledge of vital process and the apparatus and technics for directing physical nature are capable of utilization in hygienic, medical and surgical treatment of bodily changes.

If this were the whole of the story, bodily action would be wholly assimilated to inorganic action, and the inclusion of the body in behavior that has mental quality would be impossible. The remainder of the story is that chemico-physical processes go on in ways and by interactions which have reference to the needs of the organism as a whole and thus takes on psychical quality, and in human beings at least are in such connection with the social environment as confers upon them intellectual quality. Any notion that human action is identical with that of non-living things or with that of the "lower" animals is silly. It is contradicted by the fact that behavior is so *organized* in human beings as to have for its consequence all that we call civilization, culture, law, arts—fine and industrial, language, morals, institutions, science itself. And by its fruits we know it. Organic processes are thus seen to be the constituent means of a behavior which is endued with purpose and meaning, animate with affection, and informed by recollection and foresight. In the end, the bodily is but a name for the fact that wherever we have consequences, no matter how ideal, there are conditions and means. Materialism does not consist of a full and frank recognition of this fact, but in the isolation of means and conditions from what they actually do.

We have spoken so much of action and behavior that it is

needful that we should be explicitly aware of what these words signify. In particular it is indispensable to note that when we are dealing with human behavior, the word designates a kind of behavior in which outcomes of the past and outlook on the future are incorporated; with something longitudinal and not something cross-sectionally lateral. We may isolate a particular organic structure or process for study. In as far as we do so, we regard it as similar to arrangements and processes which are shared with inanimate things. But we cannot understand the organism until we have taken its history into account. We have to know whether we are studying an embryonic, an infantile, a mature or a senescent form. We have to place the particular affair studied in a career of development. In dealing with a special chemical reaction, say that of hydrogen and oxygen in bringing water into existence, we may neglect past history. We select a brief segment for study because we are not concerned with the individuality of the molecules involved; it is enough that what happens is a specimen of something which recurs and is repeated in other situations independently of the individuality of just these molecules. This is precisely the omission we cannot make in studying phenomena of human behavior. A human being carries his past in his habitudes and habituations, and we can rightly observe and understand the latter only as we are aware of the history which is included within them. That the practitioner, physician, psychiatrist and educator, is capable of dealing intelligently with the phenomena which confront him only when he knows something of their life history is a commonplace. And it is not just the life history of the particular symptom of disorder he needs to know but the life history of the individual in whom it appears. It is equally a commonplace that the need of such knowledge of life history as a whole increases in the degree in which the mental phase of disturbance is prominent.

Such facts point to what is signified when it is said that human behavior is longitudinal, not just cross-sectional. It forms a history, an autobiography, not indeed written but enacted. The import of this fact in relation to the mental phase of action should be evident. When it is neglected, any item of behavior is regarded as an immediate lateral cross-

section, and thus becomes purely mechanical, and without intellectual and emotional quality. This is precisely what happens when a reflex or specific reaction to a specific stimulus is treated as the unit of behavior, and all other behavior is treated as a compound of such units. Since the simple reflex is devoid of emotional and intellectual quality, it then logically follows that mind is not a property of any behavior. It is a fiction or a meaningless by-product accompaniment like the beauty of a rainbow with reference to a purely physical account of the refraction of light by vapor. To assert, then, that *conscious* behavior is a fiction is to draw a logical deduction from a premise, not to observe a fact. And since the fact of conscious behavior, of observing, analyzing, noting, reasoning, is involved in the whole undertaking, the absurdity of the conclusion shows the falsity of the premise. We know that the structures involved in reflexes are not as matter of fact primitive and original. The converse is true as both phylogeny and ontogeny prove. The beginning is with action in which the entire organism is involved, and the mechanism of reflexes is evolved as a specialized differentiation within an inclusive whole of behavior. The assumption that the nature of behavior is exemplified in a simple reflex is a typical case of the fallacy of neglecting development, historical career. In consequence an account of the mechanism of a particular account of behavior is converted into an account of behavior in its entirety. Only in this fashion is the role of the mental in action relegated to the realm of fiction.

The criticism may be broadened to take in the whole reduction of mental phenomena to the stimulus-response type as that reduction obtains in current psychological theory, even among those who do not call themselves behaviorists. There is no doubt that any item of behavior can be stated in terms of a response to a stimulus—just as it may be stated in terms of cause-effect. But as the doctrine is usually employed it omits to consider the one question which is scientifically and practically important: namely, how did an object or situation acquire the capacity to *be* a stimulus? For to be a stimulus in evoking a response is an additive property of physical things. The organism is constantly surrounded by indefinitely numerous conditions which affect it. If we regard them all as stimuli

because they enter into casual interaction with the living creature we say in effect that the whole universe is stimulus and also response. Such a view clearly makes the theory worthless for purposes of *analysis*. It is the occurrence of a particular mode of action we are trying to describe and account for, an attempt which implies that some special feature of the environment is so weighted as to operate as stimulus. Now what makes some physical thing or trait a stimulus is the condition of the whole organism at the time, its needs and the kind of behavior in which it is already engaged. And both of these things are longitudinal, historical; they include factors formed in previous life history. Any particular thing at any particular time is a stimulus, evoking an adaptive response and use, only in virtue of the enacted biography of the organism.

There is an attempt to recognize the importance of historical development in some forms of the stimulus-response theory. Present behavior is traced back to original "bonds" in the nervous system which are innate, or to behavior in the form of what are usually called instincts. Thus previous development is nominally taken into account. But such recognition of life history is nominal rather than real. An earlier cross-section of behavior is postulated back of which development is not traced. Consequently the position of the lateral segment in the development of action as a whole is left out. The theory is only a verbal re-statement of the compounding of reflex units theory; the only difference is that an "instinct" or a performed "bond" of stimulus and reaction, is somewhat more extensive and complex than is a reflex. But since it is not sufficiently complex and extensive to take in the needs, demands and disposition of the organism as a whole, the basic fallacy remains the same.

The reference to stimuli proceeding from the environment brings us in effect to the second way in which the account of behavior is rendered so partial and split off that its mental phase has either to be denied as a fiction or else regarded as mysterious and unnatural. For the stimulus-response theory, as usually held, cuts off the environment from behavior. It treats environment simply as an external occasion from which behavior proceeds. Behavior is thus treated exclusively as going

on inside the organism, something which is simply set off or initiated by the environment. In reality, the environment is just as much comprised within behavior as are organic processes. Behavior is not just something which goes on *in* a surrounding medium. If it were, behavior could be studied and described as something which goes on in the organism or which goes forth out of it in total neglect of environment, save the reference to some part of the latter as a touch-and-go stimulus. Behavior in fact is a continuous interaction in which environing as well as organic factors are included. This is true even of the functions we often regard as exclusively physiological. We do not just breathe, we breathe air; we do not just digest, we digest foodstuffs. We do not just move the legs and body; we walk on the ground, and from one place to another, so as to obtain a more favorable environment to be incorporated in subsequent behavior.

To describe the structures and processes of the organism in isolation, in their exclusive reference to organic structures, and then call the result an account of behavior, is to omit the most distinctive character of behavior. Sherrington's classic work "The Integrative Action of the Nervous System" marks an epoch in the development of science. What is it which the action of the nervous system integrates? Simply its own, turning upon itself as a snake is said to swallow its tail? Clearly not, but the behavior of the entire organism of which it is a part. But when and how is the action of the organism integrated? There can be one answer. It is integrated in the degree that it utilizes and transforms its environment by means of incorporating some element of the latter within behavior. Utilization here signifies that something in the surroundings is rendered a means in the carrying on of some phase of behavior, as assimilation of food and the breathing of air maintains life-behavior itself. Transformation signifies that some part of surrounding conditions is actually changed so that the environment is modified into a form more favorable than before to the maintenance of life-behavior. To describe the action of a part of the nervous system, or of the entire nervous system, or of the entire organism in isolation from the environment included within behavior is like thinking that we can understand

a machine, say a loom, if we omit the material, the yarn, upon which it works and the transformation of the material into cloth wrought in the operation. Since the mental, if it can be found anywhere, must be found in behavior which comprises *objects* of desire, thought and affection, to accept the premise which identifies behavior with the action going on inside the organism is to commit ourselves to denial of mental quality as a dialectical conclusion from a premise. Many persons will remain so assured that mental phenomena are actual facts, that they will then prefer to go on believing in them, and will treat them as proofs of a mysterious substance called mind, soul or consciousness. Thus the one-sidedness of the theory about behavior perpetuates the very tradition which a complete account of behavior would eliminate.

The bearing of the one-sided omission of environment in description of behavior upon the truly mental phase of behavior is most evident when we consider the elimination of the human or social environment. For it is the incorporation of this environment in action which is most intimately and extensively connected with the intellectual and emotional quality of behavior. The question of the role of language and other constructed signs in mind gives a crucial test. I do not question the connection of thinking with speech and other signs. Speech and the use of signs is an affair of behavior. What is questionable is the elimination of relations with other human beings from the account given of language habits and of thinking conceived as "exercised implicitly behind the closed doors of the lips"—in other words as something which goes on subcutaneously, wholly inside the organism. Such a description reduces speech to vocalization or making of sounds, and thinking to a silent exercise of the organs of vocalization and other internal structures. Now the making of sounds is not speech. Sounds issuing from vocalization are speech only when they are used to institute a mode of behavior on the part of another human being which will favorably affect the behavior of the one speaking. Sounds issue from phonograph or radio, sounds which imitate articulate speech. The phonograph does not speak, however. For while the sounds that issue may induce action on the part of others, anticipation of such action does not

enter as a factor in its putting forth of sounds. Any modification of the behavior of others which is affected by the sounds emitted by the radio is not incorporated as a factor in *its* behavior. Precisely such inclusion of objective social consequences is what transforms sounds into speech or language, as may be seen from taking any simple case of command, request or advice. Speech is primarily a mode of action by which the behavior of one is so influenced by the expected or hoped for behavior of others as to become an integral part of concerted action.

Thinking as implicit speech is made on the same pattern. It represents the social situation carried over into the habits of the organism. One talks to himself as a way of anticipating objective consequences (that is, consequences into which the environment enters) before they happen, and as a means of eventually securing those which are disliked. This renders behavior intelligent, thoughtful. It is all to the good when "consciousness" is thrown overboard as a substance or separate process designated by a noun: for "ness" indicates that the noun is abstract and results from erecting a quality of action into a thing in itself. But the quality of being conscious remains; the difference between behavior that is aware of what it is about and routine or impulse behavior is as marked a factual difference as we can anywhere discover. To deny the reality of meaning as something mysterious and unnatural, outside of connection with the range of interactions which form behavior, is to the good. But refusal to admit meaning as a quality of behavior is another matter, and one which confutes itself. For the propounders of the doctrine that meaning is non-existent address words on that subject to others; they expect their language to be understood and not be taken as a nonsensical farrago; they anticipate consequences in the way of modified behavior to result from understanding and their language behavior is modified by this expectation of response. They take it for granted that some behavior has meaning; this cannot be granted without implying that some behavior, their own for example, in the observations and analyses whose conclusion they present, is conscious: that is, aware of what it is about, of what it is doing and trying to do. The conception of behavior

in its integrity, as including a history and environment is the alternative to a theory which eliminates the mental because it considers only the behavior of the mechanism of action as well as the theory which thinks it ennobles the mental by placing it in an isolated realm.

Thus we are reminded of our beginning, the recall of happier days when the divorce of knowledge and action, theory and practise, had not been decreed, and when the arts as action informed by knowledge were not looked down upon in invidious disparagement with contemplation complete in itself; when knowledge and reason were not so "pure" that they were defiled by entering into the wider connections of an action that accomplishes something because it uses physical means. There are signs that we are perforce, because of the extension of knowledge on one side and the demands of practise on the other, about to attempt a similar achievement on our own account. I close with suggesting the imperative need of such an integration in the art of education, an integration which can become real only as the scientific man, the philosopher, the physician and psychiatrist cooperate.

The art of education is one in which every person is compelled whether he will or not to take an interest, because it so intimately concerns his own conduct. A person may begin with a narrow interest, one that cares only about, say, the education of his own children or of members of his own profession. But he does not go far before he is forced to note that he is building on a sandy foundation because of deficiencies due to earlier education. Professional education has its results limited and twisted because of the general state of education. Surveying that, it appears that its improvement cannot be made secure merely by better training of teachers. Parents, school officials, taxpayers have the last word, and the character of that word is dependent upon their education. They may and do block or deflect the best laid plans. That is the circle in which education moves. Those who received education are those who give it; habits already engendered deeply influence its course. It is as if no one could be educated in the full sense until everyone is developed beyond the reach of prejudice, stupidity and apathy.

There is no possibility of complete escape from this circle. Education returns upon itself in such a multitude of ways as to render out of the question any short cut solution. It is a matter of accelerating momentum in the right direction, and of increasing the effective energy of the factors that make for removing obstacles. Chief among these obstacles are the practices which are associated with the traditional separation of mind and body and the consequent neglect of informed and intelligent action as the aim of all educational development. The division has affected every subject of study, every method of instruction and discipline. More than anything else it explains the separation of theory and practise, of thought and action. The result is a so-called cultural education which tends to be academic and pedantic, in any case aloof from the concerns of life, and an industrial and manual education which at best gives command of tools and means without intelligent grasp of purposes and ends. The consequences of this divided education are writ large in the state of our civilization. The physician meets them in a wide range of induced disorders, to say nothing of waste and incapacitation. The walls which mark the separation are beginning to crack, although they are far from crumbling. From all sides the artificiality of isolation from one another of mind and body are commencing to be seen. There is at least the beginning of cooperation between those who are traditionally occupied with the concerns of mind and those busy with the affairs of the body. The planning of any good school building is an illustrative symbol. Architect, engineer, hygienist, teacher and public official may join forces. But there are still many who should have a say, like the psychologist, who are left out, and such cooperation as there is lacks balance. It would be interesting for example to know what physicians would say of the wisdom of the herding together of thousands of children in our gigantic buildings with the enforced need of dealing with children en masse and the institution of lockstep methods—would say if they were consulted and if they thought their voice would be heeded. The growing interest in pre-school education, nursery schools and parental education, the development of medical inspection, the impact of social hygiene, the institution of school visitors and the use of schools as social centres are other

evidences that the isolation of schools from life is beginning to give way because of cooperative action. But not even the most optimistic would hold that we have advanced beyond the outer breastworks. The forces are still powerful that make for centrifugal and divisive education. And the chief of these is, let it be repeated, the separation of mind and body which is incarnated in religion, morals and business as well as in science and philosophy. The full realization of the integration of mind and body in action waits upon the reunion of philosophy and science in art, above all in the supreme art, the art of education.

RECENT KNOWLEDGE OF EPIDEMICS

LESLIE T. WEBSTER

(Delivered before The New York Academy of Medicine, November 3, 1927)

We are all interested in one way or another in epidemiology and have asked ourselves some of its most perplexing questions. Why do certain diseases suddenly attack a number of individuals at the same time; why do they affect some and spare others; why do they spread—sometimes among a few and sometimes over a greater part of the world; why do they stop; and finally, why do they reappear after an interval of time and repeat the same series of events?

Answers to these questions have not been wanting. Had we lived in the time of Hippocrates we should have looked to the heavens for the cause of pestilence and should have assigned to comets, unusual configurations of the planets, and any remarkable natural phenomena, complete responsibility for epidemic disease. Later, in Sydenham's time, we should have dropped our eyes to the ground and considered noxious vapors and seepings from the soil as causing the trouble. At present, however, Pasteur's hypothesis is generally accepted, and we have come to regard all the varied phenomena of infectious disease as due directly or indirectly to the microbe. An epidemic starts because the specific germs have become more virulent or disease-producing; some individuals die because their microbes are highly virulent, while others are spared because theirs are less so; the disease spreads locally or widely according to the powers of the germs; stops when they begin to lose their potency; and reappears again sooner or later when a new increase in virulence is attained. The germ theory, therefore, explains epidemics entirely in terms of fluctuations in microbial virulence.

More than forty years of bacteriological research have since demonstrated that the experiments upon which this theory is based were not well-controlled and that their application is subject to considerable limitation. Furthermore, statisticians and clinicians are pointing out the close association of prevalence

of infection with season, diet, and other environmental conditions. The resisting mechanisms of the animal host, hereditary or acquired, racial or individual, also are now recognized as playing a part. Apparently, therefore, some element of truth still remains in the pre-bacteriological theories of "epidemic constitution."

Instead of reviewing in detail these recent tests and observations, I should like to speak of our own work in experimental epidemiology, so-called because its purpose is to study the mode of spread of epidemic diseases, and because its method is truly experimental.¹

The history of experimental epidemiology is brief. In 1918 Topley induced epidemics of mouse typhoid experimentally in his laboratory in London, and studied the conditions under which these outbreaks occurred.² At about the same time, Flexner, assisted by Amoss, began similar studies at the Rockefeller Institute in New York. Since then Topley has continued to work actively in England, and we in this city. Three years ago Neufeld, Director of the Robert Koch Laboratory in Berlin, and his associates, began experimental epidemiological investigations,³ and at present, in America, there are five, and perhaps other laboratories, in which these same problems are being considered.

To study epidemics experimentally, it is necessary to choose some native animal microbic disease resembling a human infection. Then at least three procedures are indicated: 1) studying the disease as it occurs spontaneously in nature; 2) inducing its various endemic and epidemic phases experimentally in the laboratory, and 3) determining and measuring the factors which cause the disease to vary in amount and severity.

We have been concerned with five native animal infections; three in mice, one in rabbits, and one in chickens. Two are intestinal and three respiratory in origin; mouse typhoid, caused by a paratyphoid organism; mouse typhoid, caused by a food poisoning, enteritidis-like bacillus; mouse pneumonia, due to a

¹ These studies are published in the *Journal of Experimental Medicine*.

² Professor Topley's reports may be found in the *Journal of Hygiene*.

³ The work from Professor Neufeld's laboratory has been published in the *Zeitschrift für Hygiene*.

capsulated organism of the Friedländer group; rabbit colds and pneumonia, caused by the plague-like pasteurella organism; and fowl colds and pneumonia, known as roup and fowl cholera, due also to a plague-like bacillus of the pasteurella group. Each has been studied as it occurs spontaneously; each has been induced experimentally in the laboratory and there analyzed under carefully controlled conditions.

The technique for observing the *spontaneous* disease in an animal community consists in familiarizing ourselves over long periods of time with the amount and type of clinical infection, and the number of specific deaths and nature of the lesions, and relating this information to the prevalence of the specific bacteria in the population. The technique used in the analysis of the *experimental* epidemics is a very special one which has two important requirements; namely, maintaining all conditions as near as possible to those occurring spontaneously in nature, and second, removing all disturbing and unknown variables.

The results of our observations on the spontaneous diseases enabled us to plan the laboratory epidemics more successfully. They gave us information concerning the various types of clinical infection and the relative amount of each, of seasonal fluctuations in type and severity of disease, and knowledge of the amount and distribution of the specific bacteria available to the population.

The most significant results, however, were obtained from studies of the experimental laboratory epidemics. Here, as elsewhere, we found the amount and severity of infection in a community to depend upon three factors: the disease-producing power or virulence of the microbe, the numbers of microbes available, and the resisting powers of the population concerned. Our ultimate task therefore lay in the measurement of these factors during various epidemic and endemic phases of each disease.

Before discussing the results of these measurements, one further word concerning technique is necessary.

Virulence, dosage, and host susceptibility are measured by administering specific organisms to animals and noting their reactions and duration of life. Formerly, in such tests, no control measures were employed. For example, culture A from a

human being was administered intraperitoneally to one mouse, and culture B in similar quantity to another. If the first mouse was found to live longer than the second, culture A was considered to be less virulent. At the present time, however, we know that microbes given to a foreign host behave in a manner quite different from when administered to their native host; that given by an abnormal portal of entry, their effect is in no way comparable to that when administered by the normal route of infection; that differences in individual susceptibilities of animals make it obligatory to use sufficiently large numbers for each test; and finally that differences in actual numbers of organisms administered exert markedly different effects. Therefore, titrations of virulence, of dosage effect, and host susceptibility differences, to be of any epidemiological significance, that is, to throw light on the natural mode of spread of disease, must be made *with organisms administered in type pure culture, in known numbers, to their natural host by way of the normal port of entry!*

We have titrated the virulence of organisms concerned with four of these native animal infections, the paratyphoid and enteritidis mouse typhoid, mouse Friedländer pneumonia, and rabbit colds and pneumonia. The cultures have been obtained from various animal populations in which the specific diseases were spreading spontaneously, or as a result of experimental procedures. We have compared the virulence of cultures taken from pre-epidemic periods, epidemic periods, and post- and inter-epidemic times. Organisms recovered from animals which have died acutely during severe outbreaks have been compared with others taken from surviving healthy carriers. The effect of animal passage on virulence has also been tested.

Throughout, our results have been consistent in that we have found no differences in the pathogenicity of type pure cultures recovered from pre-epidemic, epidemic, post- or inter-epidemic phases of these infections. Animal passage, likewise, had no changing effect on the disease-producing powers of the microbes. The bacteriophage phenomenon, present in the mouse enteritidis infection, and "bacterial variation" phenomena which occurred in all but the mouse paratyphoid disease, were found to play no part in determining the amount and severity of these outbreaks.

Hence we concluded that in the diseases studied, the microbial virulence factor is relatively constant.

Analysis of the dosage factor revealed that, in general, an increase in numbers of bacteria given to groups of animals is followed by an increase in morbidity and mortality. Furthermore, we found that by choosing proper doses of mouse typhoid or mouse Friedländer organisms and administering them to groups of mice, there resulted amounts and rates of mortality which corresponded to those occurring among our special populations during spontaneous epidemics of these diseases. Apparently, therefore, epidemics were caused merely by bringing animals in contact with the requisite amount of the specific organisms.

This hypothesis was tested further among our special populations of animals, in which spontaneous epidemics were occurring, by determining whether each outbreak was preceded by a demonstrable increase in numbers of specific bacteria available. Thus, by counting the typhoid bacteria present in the sawdust bedding, and the numbers of nasal carriers of the Friedländer organisms, we found that there was a very great rise in the amount of bacteria available to the herd before each outbreak. Wave-like fluctuations in dosage preceded similar mortality waves by an interval of time corresponding to the incubation period of the disease. We concluded, therefore, that the presence of a proper dosage of microbes is the essential cause of epidemics of these four native animal diseases.

In titrating the third factor concerned in the spread of epidemic diseases, host resistance, we were able to demonstrate consistent and significant differences in racial susceptibility to infection. Furthermore, individuals were found to differ in their ability to resist disease. For example, if a number of rabbits was given intranasal instillations of the pasteurella organism, some developed pneumonia and septicemia and died, others showed merely local rhinitis, sinusitis, or otitis media, while still others proved to be carriers, or entirely refractory. Differences in the resisting powers of individual animals were further demonstrated by selective breeding experiments, whereby relatively resistant or susceptible strains were developed.

The amount of racial and individual resistance of animals

was found to be markedly affected by dietary and atmospheric conditions. Thus, mice fed on the so-called McCollum standard diet, or on a ration containing cod liver oil, proved far more resistant to the paratyphoid and Friedländer infections than other groups fed on the usual bread and milk formula. Hence we sought to determine whether in the special populations of animals under observation there were fluctuations in resistance to the specific infections, which might account for the increased dosage and epidemic outbreaks observed.

Unfortunately, we have not been able to devise a technique suitable for the direct measurement of population resistance, but we have succeeded in altering this factor experimentally and observing the effect of such a procedure on the course of disease. By subjecting a community of rabbits to daily fluctuations in temperature of about 50° F., we apparently brought about a marked increase in the number of carriers of the pasteurella organisms and subsequently in the amount and severity of snuffles and pneumonia. And by keeping a part of this population on a partially restricted diet, we noted at all times a carrier rate greater than that of the remainder of the community not so treated. The carrier rate and amount of Friedländer and enteritidis infection in the special populations of mice were strikingly influenced by substituting the beneficial McCollum diet for the usual ration. And when the daily increments to these populations were made up of susceptible races of mice, rather than the usual relatively resistant strain, the amount of disease increased immediately. Apparently, therefore, a lowering of population resistance is followed by an increase in the number of virulent organisms and the amount of disease present in the community, while an enhancement in the communal powers of defense leads to a corresponding decrease in dosage and mortality.

We conclude that in the native animal diseases studied, microbic virulence does not fluctuate and that epidemics are incited directly by an increase in the numbers of specific bacteria available to the population. We believe this increase in dosage is the result of changes in host resistance and that these changes may be brought about in two ways, according to whether the specific organisms are already present in the community, or

gain entrance to it from without. If the bacteria are exogenous, they ordinarily meet with a population of little or no resistance, multiply, and disseminate rapidly, and thus cause a severe epidemic. If, on the other hand, the pathogenic microbes are already present in a given community, an increase in dosage takes place when population resistance is lowered, through births, migration and fluctuations in seasonal, dietary, and other environmental influences.

At present we do not wish to generalize too far, nor to extend our conclusions to human disease, but we do wish to stimulate further thought on these questions. Is there any proof that human pathogens change in virulence? May not typhoid and dysentery outbreaks from food or water contamination, pandemic influenza, plague and cholera of the middle ages, tuberculosis and exanthemata of isolated communities have been due to foreign organisms coming in contact with a highly susceptible population, thus leading to tremendous increase in available dosage? And may not endemic pneumonias, exanthemata, common colds, Oriental plague, cholera, and malaria be caused by lowering of population resistance to organisms already present in the community, leading thereby to an enhancement of dosage?

Careful experiments, well controlled, are needed before we can venture an answer to these questions. But if it prove that the amount of population resistance does determine the amount or dosage of virulent bacteria present in a community, and thus controls the prevalence of infectious disease, then for the first time we are shifting the responsibility for epidemics from the field of the mysterious to that of an understandable, concrete series of events; we are approaching the time when we may hope for control over pandemic outbreaks, and are justifying experimentally any and all attempts toward personal and social hygiene. From the clinician and health official we shall need aid in the further pursuit of this problem. I speak tonight for this and for your renewed interest in epidemiology.

ABSTRACTS OF PAPERS DELIVERED AT SECTION MEETINGS

*Combined Meeting of the Section of Neurology and
Psychiatry with the New York Neurological
Society, November 1, 1927*

CEREBRAL PNEUMOGRAPHY. APPLICATIONS OF VENTRICULOGRAPHY AND ENCEPHALOGRAPHY

WILDER PENFIELD

Ventriculography by direct injection of air into the ventricles and encephalography by the spinal injection of air have come to be accepted diagnostic aids to neurology. The judicial use of these methods has been made difficult because of the lack of frank discussion of the advantages and dangers in the methods. Some workers have been dazzled by the brilliant diagnoses which can sometimes be made and have perhaps relied too greatly on the methods, minimizing the attendant dangers and forgetting that the diagnosis might sometimes have been made with equal definiteness by more careful neurological examination. Other workers have been discouraged from further use of the methods because of a fatal accident or because of inability to interpret the pneumograms. It is necessary to use careful discrimination in regard to the type of case involved before forming a judgment concerning either the dangers or the value of cerebral pneumography by either method.

Pneumography in Diagnosis

Both the spinal and ventricular injection of air for diagnostic purposes were first described by Dandy in a series of brilliant papers. Unfortunately he failed to give implicit warning and technical advice concerning the method which might have helped the other neurological surgeons and neurologists who have since found the method useful.

The chief service of pneumography at present is localization of expanding lesions in the brain. When used for this purpose as for other diagnostic purposes, the method must always be considered a supplement to the other forms of neurological examination and where diagnosis can be made without its aid, air injection should not be employed.

The location of expanding lesions may be judged by alteration in the form of the ventricles. A ventricle may be obliterated by direct pressure, may be displaced away from the tumor, or may be caused to dilate because of distal obstruction to the outflow of cerebrospinal fluid. It should be borne in mind that neoplasms and other expanding lesions push but do not pull upon the ventricular walls. Thus, an expanding lesion in the right frontal lobe may cause obliteration of the right anterior horn of the lateral ventricle, marked narrowing of the right inferior horn of the lateral ventricle (so that this horn shows only as a narrow slit) and also dilatation of the body, and of the inferior and posterior horns of the ventricle on the opposite side. It may likewise cause dilatation of the posterior horn on the same side. These enlargements are due to more or less complete obstruction of the ventricle of foramina of Monro.

An expanding lesion on the lateral aspect of the hemisphere may partially obliterate the ventricle on that side and may displace both lateral ventricles toward the opposite side or down, depending on the position of the lesion. It is unnecessary to point out here the characteristics of the symmetrical dilatations which these ventricles undergo as the result of simple obstruction of the downward pathway of the spinal fluid into the posterior fossa and even forward in the basal cisternae.

It is true that in certain situations, tumors may progress a long way even to death and give no evidence of their presence as seen by ventriculography. For example, an infiltrating tumor of the pons may cause death before giving rise to hydrocephalus but such cases are rare and with all the means at our command the diagnosis of unlocalized brain tumor is as a general rule no longer justified.

In addition to the localization of an expanding lesion, pneumography may be used to rule out the presence of an expanding lesion and thus differentiate between a vascular lesion and an expanding one. If carefully done, air in the ventricles does not seem to give rise to an unwarrantable risk after an old cerebral thrombosis. Pneumography has been well used to localize the site of the block in hydrocephalus. Also occasionally it has been found useful in localizing a spinal fluid block

due to tumors of the spinal cord. Here, however, lipiodol offers certain advantages, the chief of these being that the slender column of air is much less readily seen through the thick tissues of the trunk than is the lipiodol.

In addition to localizing obstructive and expanding lesions, pneumography is of help in the study of brain scars and it should be borne in mind that a scar following direct brain injury produces its alterations in the outlines of the ventricle in a very different manner from that of an expanding lesion. Foerster has described what he called "wandering of the ventricle." This "wandering" takes place *towards* the side of the brain injury. Thus the whole ventricular system may be pulled towards the site of the lesion, not pushed away from the site, as in the case of an expanding lesion.

Histological study shows very clearly the mechanism of this traction. Laceration of the brain and hemorrhage in it produces a connective tissue scar usually attached to the overlying brain-covering. The great plexus of vessels which is found in such scars is pulled upon and this pull transmitted directly to the cerebral vessels and from them to the brain substance by means of the perivascular attachments of astrocytes.

The choice between ventriculography and encephalography must be made according to the individual case. In general, encephalography permits a more complete study of the ventricles.

Among the untoward reactions are the rare hemorrhage from puncture of a tumor by a ventricular needle, and marked subsequent increase of intracranial pressure. These reactions are seen in cases of brain tumor. The first may be guarded against by approaching the ventricle through the occipital lobes after examining the visual fields. The second, either removal of the air after roentgenography, or immediate operation. The other untoward reaction chiefly to be feared is a sudden bulbar paralysis with evidences of vasomotor collapse. This may appear in encephalography in apparently normal cases where the ventricle as well as the subarachnoid is filled.

In a case of encephalography which I observed this happened suddenly when the patient's brow was turned down and oscil-

ated and I attributed it to rather sudden filling of the fourth ventricle with a large air bubble. His condition was very bad for about 10 minutes after which respiration became normal and pulse regular.

In general encephalography may be used to advantage to study the subarachnoid space and cerebral convolutions in cases where the intracranial pressure is not raised. It should rarely or never be used to study cerebral neoplasm. For this condition ventriculography is less dangerous and more useful.

The indications for cerebral pneumography must be carefully scanned but the timorous attitude of some workers is no longer justified. The risk of the method in each case depends entirely on the nature of his lesion. In brain tumor the mortality is much higher but the necessity of localization is imperative.

Therapeutic Use of Lumbar Air Insufflation

I should like to direct your attention to the use of lumbar insufflation in the therapy of traumatic headache. Occasional observations of relief from chronic headache in the course of encephalographic studies have been made by Hirsch, Bingel, Foerster and Carpenter.

Without knowing of these incidental reports of relief from headache it has been my fortune during the past year to discover that a certain type of headache may be treated by lumbar insufflation with almost invariable success as outlined in a shortly forthcoming report. The first case in the series was treated five years ago. The patient was suffering from severe frontal headache following a fracture of the skull six weeks previously. The air was caused to pass through the subarchnoid spaces to the site of the pain for purely diagnostic purposes and to my surprise the boy was completely relieved of his headache and vomiting, which had been his only complaints.

Four years later the expedient was again undertaken, this time for headache and as an experiment to see whether or not a patient suffering from post-traumatic headache of 18 months' duration could not be relieved. This patient's suffering had been so great that it was feared that he would commit suicide.

Chronic meningeal headache has the following characteristics: localized pain in the head and transient vertigo are the cardinal symptoms of which these patients complain. The headache is invariably localized. It may spread to a certain extent but is definitely referred to one particular part of the head. In most cases the pain is situated near the site of the blow but there seems to be a tendency for the pain to migrate forward into the frontal region and in some cases the pain has been on the opposite side of the head from that which was struck.

The pain is dull and is often described as "hammering." There are at times, in addition, fleeting sharp stabbing pains at the same site. These may be more noticeable in bad weather. The headache is usually present every day with some tendency to diurnal variation often being worse in the late afternoon.

The vertigo is usually present from the start. It comes on when the patient rises from a sitting position or may appear at any time and usually lasts for several minutes. There is no sense of rotation but the patient finds it necessary to grasp something and hold on until the sensation has disappeared.

In general there are no physical signs typical of the condition. The blow is often associated with a fracture of the skull but not necessarily so. A period of unconsciousness following the accident has been usual but not at all invariable.

There is a striking similarity in the patient's complaints which seems to justify the recognition of these complaints as a syndrome, and the uniform relief which lumbar air insufflation has afforded seems to indicate that the method, if properly used, may be a specific treatment.

The pathology of the condition is not clear as yet. It has been frequently suggested by Foerster, Schwab and others that the cystic arachnitis serosa which may follow trauma to the head may be responsible for the post-traumatic complaints. The pneumograms of these patients have shown in two cases definite evidence of subarachnoid cyst formation. In many of the cases there is an escape of air from the subarachnoid space to the subdural space. In certain cases roentgenography does not show any definite evidence of a pathological process in the pia-arachnoid space. The number of cases investigated is too small to form a conclusion with regard to the mechanism respon-

sible for the production of the pain and dizziness. It seems likely, however, that the passage of the bubble of air through the subarachnoid space frees the brain so that fine adhesions are broken or a post-traumatic obliteration of the subarachnoid space is opened.

Lumbar air insufflation as used in such cases should be done with considerable caution and with all necessary safeguards. The treatments are done in the reclining position and movements of the head made so as to carry the air into the subarachnoid space, completely filling this space over one cerebral hemisphere. The position filled should be the site of the pain and with little or no passage of air into the ventricle. The patient should be kept flat in bed until the air has absorbed.

The suggestion is made that the same type of meningeal headache may possibly follow infection of the sinuses or mastoid region and may explain the chronic headache which sometimes continues independently of the primary infectious process. It is suggested that these inflammatory meningeal headaches may likewise be susceptible of relief by lumbar air insufflation. The method should be used cautiously and never employed where there is already increased intracranial pressure due to a lesion in the posterior fossa.

THE CLASSIFICATION OF EXTRADURAL SPINAL TUMORS WITH REMARKS ON THE ORIGIN OF THE SO-CALLED ENDOTHELIOMAS¹

CHARLES A. ELSBERG

Primary, secondary and metastatic extradural growths *within the cranial cavity* are relatively infrequent as compared with intradural tumors of the brain and it is rarely difficult to distinguish the one from the other. Extradural compression of the *spinal cord* by growths is observed in more than 25 per cent. of spinal tumors. Most of the growths cause cord or root symptoms by direct pressure; some by interference with the blood supply and secondary myelomalacia; in others the

¹The paper will be published in full in Surgery, Gynecology and Obstetrics.

interference with cord function is due to a sinking together of the bodies of several vertebrae and not to the direct pressure of the neoplasm.

The classification of extradural tumors without adequate differentiation between those that are *primarily* extradural and those that *secondarily* extend into the vertebral canal has led to considerable confusion as far as the symptoms are concerned.

Extradural spinal tumors should be divided into (1) primary extradural; (2) secondary extradural; (3) metastatic extradural.

In a series of 179 cases of spinal tumor, not including intramedullary or metastatic growths, 46 were extradural. Of these, 52 per cent. were primary and 48 per cent. were secondary.

The primary tumors arise from dura, nerve roots or epidural fat and blood vessels or from the bony, cartilaginous or ligamentous walls and are located entirely within the vertebral canal.

Many of the primary extradural growths are benign and encapsulated and completely removable. The meningeal and perineurial fibroblastoma, the fibroma angioma, and chondroma are usually single. The primary extradural chondroma occurs in two forms: in the one, the growth lies in the extradural space on the ventral or dorsal aspect of the dural sac; in the other, the growth is derived from and firmly fixed to an intervertebral disc.

The primary extradural sarcoma occurs in two forms. Either the growth is derived from the dura and has no tendency to become adherent to or to involve the bony walls of the vertebral canal, or it begins within the canal, erodes the surrounding bone, and grows outwards forming an hour-glass or dumb-bell shaped tumor.

The second extradural tumors are either benign or malignant, and extend into the vertebral canal through intervertebral foramina or by bone erosion. They arise from the vertebrae or paravertebral soft tissues and may be extensions of growths

in the thorax or deep tissues of the neck or back. In these secondary growths, the true spinal symptoms only begin when the tumor has extended into the spinal canal or has interfered with the blood supply of part of the spinal cord. With some exceptions, cord symptoms are more acute in their onset and more rapidly progressive. In the author's series, the development of spinal cord disturbances was a gradual one in 23 per cent., and rapidly progressive in 77 per cent.

Secondary extradural should be kept distinct from the metastatic extradural growths.

At least 30 per cent. of patients with primary or secondary extradural tumors can be greatly improved or permanently cured. The proportion is larger in the primary than the secondary, and in benign than in malignant growths.

Finally, the speaker made some remarks on the histological classification of encapsulated tumors of the nervous system and recommended the classification of Penfield-meningeal fibroblastoma (endothelioma, meningioma, arachnoid fibroblastoma), perineurial fibroblastoma (solitary neurofibroma), and the neurofibroma of von Recklinghausen's disease.

The meningeal fibroblastomas commonly known as endotheliomas or meningiomas, probably arise from cells of the perimedullary mesenchyme, which embryologically belong to the arachnoid but which have remained with the cells of the dura or pia mater or in the arachnoid itself. The speaker had found spinal endotheliomas in relation to every surface of the three membranes excepting underneath the pia mater. The study of the spinal endotheliomas has therefore contributed much to the understanding of the origin of this type of newgrowth.

THE MODERN TREATMENT OF TRIGEMINAL NEURALGIA

BYRON STOOKEY

In March, 1926, before the Medical Society of the State of New York, Section in Surgery and Neurology, Dr. Stookey read a paper on differential section of the trigeminal nerve

for trigeminal neuralgia. Up to the time of that report Charles Frazier's subtotal resection of the trigeminal nerve, *i.e.*, saving the ophthalmic fibers and motor root, was the procedure employed. The method suggested before the New York State Society was a further step in the refinement of the procedure, which had previously been so brilliantly developed by Dr. Frazier, in that according to the technique advanced by Stookey a true differential section of the dorsal root is now done, selecting for section those fibers proximal to the ganglion which are derived either from the maxillary or the mandibular division, according to which division gave rise to pain.

This procedure has now been done for several years with signal success, especially in those cases in which pain has been limited to the mandibular division. Selection of the fibers derived from the maxillary division, without injury to the fibers from the ophthalmic or mandibular divisions, has been more difficult to perform and as yet has not been possible with uniformity, since some of the adjacent fibers from the ophthalmic or mandibular division are likely to be cut in the attempt to segregate the fibers of the maxillary division for section. With further experience and greater skill in technique it is felt that greater assurance may be developed and the maxillary fibers identified as readily as are the mandibular. Differential section is especially desirable in those patients in whom the pain has been limited to the mandibular division. In these the sensory fibers derived from this division can be cut and the motor fibers running with the mandibular division saved without injury to the maxillary fibers or the ophthalmic, thus destroying only those fibers along which pain has been carried without disturbing the motor division to the muscles of mastication and leaving the patient with a minimum anesthesia and its attendant paresthesias.

Dr. Stookey called attention to the fact that separation of the trigeminal nerve into two nerves, the ophthalmic and the maxillo-mandibular nerve, was the rule in comparative anatomy of this nerve and that this separation of the gasserian ganglion into separate parts had been stressed by Giglio-Tos (1902) ¹

¹ Tos, Giglio. Sull' origine embrionale del nerve trigemine nell' uomo. *Anat. Anzeiger*, 21, 1902.

and in a more elaborate study by Frazier and Whitehead (1925).²

In addition Dr. Stookey pointed out that in herpes zoster the inflammatory process within the ganglion may be limited to the ophthalmic or maxillo-mandibular portions thus suggestive clinical evidence is offered that a line of separation within the ganglion may exist as is indicated by its comparative anatomical development. Further clinical evidence of separation within the ganglion was pointed out in that pain may affect any one of the three divisions and that primary pain in the ophthalmic division is extremely rare.

Patients were shown illustrating differential section as done by Dr. Stookey during the past few years at the Neurological Institute together with lantern slides of operations and additional cases.

Discussion

Dr. Stookey: An electrode is used to pick out the motor fibers. The trouble is that considerable dispersion of the current occurs especially when there is any cerebrospinal fluid in the wound, making accurate identification of the motor root by this method of little value. I do not believe the electrode would help to differentiate the sensory fibers. If we were able to touch the afferent fibers and watch the patient carefully I think possibly we might find some help such as reflex phenomena which would be an aid as you suggest.

Section of Surgery, November 4, 1927

THE TREATMENT OF COMPOUND INJURIES OF THE EXTREMITIES

JOHN H. GARLOCK

In this age of mechanical industry and automobiles, hazards are great and accidents are many. Occupational injuries, it seems, are decreasing gradually, due, in great part, to the in-

² Frazier, C. H. and Whitehead, E. Morphology of Gasserian Ganglion. *Brain*, 48: Pt. I, 158, 1925.

stallation of safety devices, and also to educational propaganda among the workmen by means of lectures, posters, etc. Injuries caused by motor vehicles are probably on the increase, as evidenced by recent statistics. The total number, augmented by accidental injuries received in other ways, is appalling when statistics covering large sections of the United States are analyzed. While, undoubtedly, the future will bring methods for decreasing the number of accidents, the situation at the present time must be met by the intelligent treatment of these injuries, so that there will be a saving of life and limb with return of form and function as near to normal as possible.

The writing of this paper was undertaken with the idea of presenting our experiences with many various types of injuries of the extremities, indicating the type of therapy giving satisfactory results. The cases forming the basis of this communication were patients on the Second Surgical Division of the New York Hospital.

The lessons learned from the recent war are gradually being forgotten, and it is mainly the purpose of this paper to emphasize again the practice and teaching of surgeons at its termination.

In the treatment of such injuries, the first step is the organization of a service in each hospital which will be under the supervision of men especially interested in this type of work. Secondly, all these patients must be considered as emergencies; and thirdly, when the principle of wound excision, combined with that of irrigation, becomes universally accepted as the basis of initial treatment, a marked improvement in results may be expected. One must also accept the principle of early active motion especially in joint and tendon injuries, and in a selected group of compound fractures.

Wounds of Soft Parts. With the possible exception of small clean wounds, all injuries of the soft parts should be subjected to the operation of débridement, after the preliminary preparation. This treatment is especially applicable to wounds of the hand, where infections, which are common, cause serious disabilities. Then, after débridement, these wounds should be sutured loosely, so as to avoid undue tension. When operation cannot be performed, cleansing, iodination, and the application

of a few sterile adhesive straps should constitute the extent of treatment. When these injuries involve the extensor tendons, they should be sutured at the primary operation. There is usually a return of full function. A different situation is encountered, however, when the flexor tendons are injured. In such conditions, if the wound is clean, a primary tenorrhaphy can be performed. If the wound is grossly contaminated, and the surrounding skin is macerated, it is wiser to defer the tenorrhaphy until the super-imposed soft part wound has healed.

Wounds involving muscles and fascia, must be débrided. Traumatized muscle is an excellent culture medium for anaërobes, and gas bacillus infections must always be thought of. In all such injuries, conservation of limb should be the prime consideration, when possible; but it must be disregarded when conservation of life becomes the main issue. The advisability of suturing such wounds must be seriously considered. In general, it may be said that most of them can be closed without drainage. When, however, there is marked crushing, it would seem wiser to leave the wound wide open, or perform a partial suture. When the history of the injury indicates a strong possibility of implantation of the anaërobes, it is wiser to leave the wound wide open.

Compound injuries opening into joints, may be treated as injuries elsewhere in the body, because a joint that has been opened by an injury does not necessarily become infected. If the capsule can be brought together, immediate closure seems preferable. The following pre-operative treatment is carried out in all compound injuries:

After the patient is anaesthetized, the whole region involved and a wide area of surrounding skin is shaved and carefully and gently scrubbed with sterile soft brushes and tincture of green soap. The soap suds and debris are washed away with sterile saline, care being taken to prevent the washings from entering the wound. The limb is then dried with sterile towels, followed by a wash with benzine. A copious irrigation with ether then follows. The wound and surrounding skin is then mechanically cleansed by a prolonged irrigation with sterile saline. The parts are then thoroughly dried and again flooded with ether. The entire area, skin and wound, is then painted with 3½% alcoholic

solution of iodine, care being taken to keep the iodine from synovial membranes, such as in a joint or tendon sheath. The extremity is then draped. Cultures are taken from the depths of the wound and also from the surrounding skin; they should be so planted as to demonstrate anaërobes, if present.

A painstaking débridement of all traumatized skin and deeper tissues is then performed. It is important to obtain absolute hemostasis. The joint capsule and the super-imposed structures are then sutured with interrupted stitches. Undue tension of all structures must be avoided. Releasing incisions in the skin flaps aid greatly in preventing this tension in the skin. All patients with compound injuries are given tetanus antitoxin. The period of immobilization in joint injuries, varies with each case. In general, the earlier active motion is started, the better will be the end-result.

Compound Fractures and Dislocations. All fractures compounded from without inward should be subjected to the operation of débridement. The majority of fractures compounded from within outward can be treated as simple fractures. Frequent use has been made of the intravenous glucose insulin therapy, recommended by Fisher, to overcome the initial shock that many of these patients present. At operation, it is important to excise all traumatized muscle and hematomata. After reduction of the fracture, many require some form of fixation. It has been our custom to use kangaroo tendon rather than some form of metal plate or band. The majority of femur fractures have been treated by débridement followed by traction and suspension. The majority of these wounds can be closed without drainage. When the history, however, indicates a strong possibility of implantation of anaërobes, it would seem wiser to leave the wound wide open for dakinization. External fixation in nearly all uncomplicated fractures of the leg, arm or forearm, can be obtained by the application of a circular plaster cast. The wound is inspected daily through a window. An elevation of the temperature and pulse rate is of serious prognostic significance, indicating usually beginning gas gangrene. The subsequent treatment is dependent upon the type of injury, and follows the same general rules as in the treatment of simple fractures.

Wounds With Loss of Skin. In wounds of lesser magnitude, without associated bone injury, it is frequently possible to bring about approximation after débridement and undermining of the skin flaps. When, however, this cannot be done, other methods are available:

1. The application of a pedunculated flap from an adjacent or distant region of the body, a method particularly applicable to wounds of the hand, wrist, and foot.

2. The application of Thiersch grafts after débridement. This method probably is most suitable for the majority of such wounds. A secondary skin flap operation can be done later, if necessary.

3. If the wound is accompanied by extensive crushing and devitalization of tissue, it is probably wiser not to attempt immediate skin grafting, contenting oneself with as thorough a débridement as possible. Intensive dakinization subsequently, followed by the application of Thiersch or Davis pinch grafts as soon as the appearance and bacteriology of the wound permits, forms the basis of the additional treatment.

4. The application of a free, full-thickness skin graft after débridement. Theoretically, this method is open to many objections for the particular type of case under consideration.

When, in addition to loss of skin, there is an associated bone injury, it is probably wiser to defer skin grafting to a later date. It must be remembered that bones covered only with subcutaneous tissues, and skin, such as the tibia, must be covered with a pedunculated flap in order to prevent subsequent ulceration.

Amputations. Every attempt should be made to save a limb, providing this can be done with a clear understanding of the possibilities involved. Some will subsequently come to secondary amputation, but the not infrequent case will come through with a serviceable limb. Primary amputation is indicated:

1. When the entire blood supply distal to the injury has been cut off.

2. Frequently when there has been an avulsion of the skin of an entire extremity.

3. When there has been irreparable crushing of bone and soft parts.

The site of amputation will depend on the situation and extent of injury, the proximity of neighboring joints and a consideration of the subsequent use of an artificial limb. In upper extremity amputations, every attempt should be made to preserve as much tissue as possible, especially in the hand.

The most important question to be decided pertains to the advisability of suturing such amputation wounds at operation. It would seem after a consideration of the various factors involved, that the majority of these stumps should be left wide open. At a subsequent date, when it is certain that there is no infection, the skin flaps can be coapted with adhesive straps or a secondary suture can be performed.

Section of Pediatrics, November 10, 1927

NEUROBLASTOMA OF THE ADRENAL IN
YOUNG CHILDREN

MARTHA WOLLSTEIN

Primary tumors of the adrenal medulla occurring in young children, congenital in origin and malignant in course, have been known for a long time. They appear in the literature under various headings. Wright in 1910 studied this group of neoplasms and described them as neurocytoma or neuroblastoma of the adrenal medulla. Wright drew attention to the similarity of the morphology and arrangement of the cells and fibrils in these growths to that in the anlage of the adrenal and the sympathetic nervous system at certain periods of their development. On the basis of the most recent histological investigation Bailey and Cushing prefer the name sympathicoblastoma because the tumors originate from embryonal pluripotential cells of the sympathetic nervous system. While the majority of the reported tumors of this type have been found in or growing from the adrenal medulla, they may grow from sympathicoblasts anywhere in the body. Thus tumors not involving the adrenal gland have been reported by Landau from the abdominal sym-

pathetic chain in a girl of eight months and by Boyd in a boy of four and one half years, while Martius described one from the cervical sympathetic in a boy two and one half years old. Pick's case grew from the uterus, and Anderson and Shennan found one growing in the apical region of the right lung in a girl twelve weeks old.

At the Babies' Hospital a series of nine adrenal sympathicoblastomata, proven by microscopic study at operation or at autopsy, have accumulated. These nine neoplasms fall into several distinct groups clinically and anatomically. Three were boys and six were girls. The tumor involved the left adrenal in four cases, the right in four cases, and both in one instance. The age of the children varied from three weeks to almost three years, three being under the age of one year, three in the second year, and three in the third year of life. There were five different types according to the location of the primary tumor and its metastases. Thus we have, first, the simplest case of the series, where a small nodule was found in the left adrenal, leaving the greater portion of the organ in an apparently normal condition, and forming no metastases. This tumor showed on microscopic examination the most typical and exquisite structure of embryonal sympathetic cells and fibrils according to Wright's classical picture.

The next type was illustrated by two cases, three weeks and nine months old, respectively, and both boys. The younger child showed the primary tumor in the right adrenal, the elder in the left. Both showed metastases in the liver, enlarging it so greatly that it became the outstanding symptom. No other metastases were present. While cases of this (Pepper) type occur most often in young infants, Morse and Wolbach have reported a case in a boy four years old.

The third type conforms to what is known as the "Hutchinson type of round cell sarcoma of the adrenal." It was represented in our series by two cases, one boy and one girl, respectively eighteen months and thirty-one months old. In the latter it was the right adrenal which was affected, while in the former the left side was the seat of the primary growth. Both of these children showed metastases over a much wider area, involving bones of the skull, the ribs, the liver, one kidney, and in the case

of the girl, the dura mater as well. The liver was involved to a much less extent than was the case in the second group. The children thus affected are, in most cases, in the second or third year of life.

In the fourth group there were again two patients, a boy of twenty-three months and a girl of twenty-six months. In the boy both adrenals were affected. In the girl only the left. Both were characterized by an inoperable tumor lying in front of the vertebral column between the adrenals and kidneys, making a mass from which kidneys, adrenals, and prevertebral neoplasm had to be painstakingly separated and dissected. The prevertebral mass was a second tumor focus, and there was a metastasis in one kidney.

The fifth group consisted of two cases where the neoplasm was quite unattached to the kidney and to the surrounding structures, and therefore operable. One of the children, a boy fifteen months old, is alive one year after operation. The neoplasms from both these children showed areas of sympathicoblastoma and of ganglioneuroma; that is, in some parts of the growth the cells had become differentiated into ganglion cells, and these portions were more firm and white.

No case of complete recovery has been reported; that is, the prognosis is practically always fatal, because the growth is either locally invasive or it metastasizes early, leaving only a small percent of the cases which are operable when diagnosed.

THE EARLIER DIAGNOSIS OF MEASLES

PHILIP MOEN STIMSON

Inasmuch as the coming half year will probably show a heavy incidence of measles, this disease apparently occurring in biennial waves in New York City, it would seem advisable once again to emphasize the familiar details in the early clinical diagnosis of measles, and, if possible, to suggest new or less well-known features which might aid in the still earlier recognition of the presence of measles. Of the four periods of the disease, those of incubation, of invasion, or catarrh, of the rash, and of convalescence, only the first two are discussed here.

In the last half of the period of incubation there may be a temporary loss of five to six ounces in weight and the blood count may show a lymphocytic leucopenia towards the end of the period.

The period of invasion or catarrh begins in the great majority of cases with fever. Within a half day or so, there next may occasionally be found a "measles line" or linear congestion in the mucous membrane of the lower eyelid, about a third of the way from the blepharal margin to the fornix. In ten children where a typical measles line of this sort in the eye was observed and the disease prognosticated at this stage, it subsequently became manifest in eight. The duration of the line as such is short, the injection spreading to become a general conjunctivitis when the other evidences of catarrh appear, such as coryza and cough, comprising with conjunctivitis the "three C's," characteristic of the second or third day of the disease and the cause of much of its spread to other people. The rash in the throat, or enanthem, usually precedes the "three C's" as may also a short-lived prodromal rash on the body. Koplik's spots inside the cheeks, and which have also been reported as having been found in the eyes, nose, and vagina, usually follow after the catarrh in order of appearance; hence measles patients have been contagious with their catarrh for an appreciable length of time before the finding of Koplik's spots establishes the diagnosis. The typical exanthem characteristic of the disease follows usually at least a day later, after the appearance of the pathognomonic Koplik's spots—often more.

Uncomplicated measles rarely kills, deaths being due almost without exception to the effects of secondary infections. Therefore every case of measles should be isolated at its onset from every other case. Experience in hospital and home has shown conclusively the value of this measure, and the harm that follows not using it.

Therefore, this winter and every year, we must be prepared to make the earliest possible diagnosis of measles, to isolate the patient on the first suspicion, and to protect him from secondary infection.

DERMATOLOGICAL CONDITIONS AS SEEN
IN CHILDREN

A. BENSON CANNON

Eczemas and impetiginous infections are the most frequently seen dermatological conditions in infants and young children. For convenience, we make three groups of the commoner forms of eczemas, classifying them according to etiology, as infantile, seborrheic and pyogenic.

Infantile eczema usually occurs in infants from three weeks to six months of age, appearing as a bilateral, symmetrical, diffuse, catarrhal dermatitis on the cheeks and often extending to other parts of the body. Seborrhea occurs first on the scalp as a dry, finely scaly affection and on spreading to the body, the lesions are sharply demarcated erythematous patches, the scales being dry or slightly oily. Pyogenic eczema begins as staphylococcic infection beneath the vernix caseosa and gradually involves the scalp, face, and body as a sharply defined red, crusted, purulent condition. Other conditions, analogous to and stimulating these eczemas, but of different etiology and requiring somewhat different treatment, are mycotic infections, infectious eczematoïd dermatitis and so called "candy" eczema.

Of the impetiginous infections, simple impetigo is the most prevalent, occurring usually on the exposed parts of the skin as an erythematous, vesicular, bullous, yellow and waxy, crusted condition. In new born infants, the affection sometimes becomes generalized, appearing as an epidemic in hospital nurseries, and often ending fatally. Another impetiginous infection (Ritter's disease), also occurs in the new born as a generalized, moist, exfoliative dermatitis of streptococcic origin. This type also frequently ends in death. There is a follicular impetigo (Bockhardt), usually beginning as a papular and pustular eruption which often spreads over the entire body and extremities, and which may prove fatal.

Two dermatoses, met with in early life and characterized by intense itching, are prurigo mitis and lichen chronica simplex. While dissimilar both have often been attributed to protein sensitization and both are chronic.

Being able to distinguish between the several types of eczemas and recognizing the form of treatment indicated often enables one to predict with some degree of certainty the results which can be obtained in the individual case. While we are unable to effect a cure in all children suffering from true infantile eczema, we can always alleviate the condition for a longer or shorter period. Impetiginous infections, except sometimes in the new born, can usually be promptly and permanently cured by the ordinary antiseptic and antiparasitic remedies.

CASE REPORT

H. R. CRAIG

Two cases of xeroderma pigmentosum are shown. The patients are sisters aged twenty months and five years, of Italian parentage. The father, aged forty-one years, and the mother, aged thirty-one years, are living and well. Of a family of six children the eldest, fourteen years old, is living and normal. The second child died with xeroderma pigmentosum, with generalized carcinomatous metastases, at the age of nine years. The third and fourth children are living and well. The fifth and sixth children are the patients shown.

Patient No. 1. Age five years. She was born in December, 1922, and four months later photophobia was first noticed, followed shortly by slight tanning and freckling. The child was first taken outdoors in June at the age of six months. The feeding and developmental history were normal. The photophobia, freckling and general tanning became progressively more marked, especially on the exposed surfaces, until about a month before admission there appeared masses on each lower eyelid. Under the right eye is a hard keratotic mass, irregular in contour though more or less pyramidal in general outline, greyish brown in color, avascular and entirely insensitive. On the lower left lid is a globular mass about 2.0 cm. in diameter, located near the inner canthus, very elastic to touch, telangiectatic in char-

acter, and has on its median surface some keratosis. About its base there is some thickening and infiltration suggesting neoplasia probably of the acanthoma type. This mass is not tender. The skin over the entire body is markedly tanned and on the exposed surfaces there is abundant freckling, with small miliary areas of telangiectasis and atrophy of the skin. In addition, at the back of the neck there are several small areas of keratosis. The mucous membranes are not involved and otherwise physical examination reveals nothing. The laboratory findings are as follows: Hgb. 60%—R.B.C. 4,016,000—Platelets 464,000—W.B.C. 7,550—Polys. 75%—Lymphos 25%. Fragility, normal. Urine, normal. Sugar tolerance test, normal.

Blood Sugar.....	110	mgn.	per	100	cc.
Blood N.P.N.....	40.5	"	"	"	"
Urea N.....	15.7	"	"	"	"
Calcium.....	11.2	"	"	"	"
Phosphorus.....	5.0	"	"	"	"
Cholesterol.....	0.121	"	"	"	"
Van den Bergh.....	negative				
Urine-Urobilinogen.....	negative				
Melanin.....	negative				
CO ₂ Combining Power.....	55.5	vol.	per	cent.	

Patient No. 2. Aged 20 months. Feeding and developmental history are normal, and physical examination shows nothing abnormal except marked generalized tanning over the entire body with greatest pigmentation and freckling over the exposed surfaces, especially the face. The photophobia is marked. There are no keratoses or telangiectases. The laboratory findings are similar to those in the older sister.

We have two cases of xeroderma pigmentosum occurring in sisters, one in the earlier stages, the other presenting the later phases with skin atrophy, keratoses, telangiectases and carcinoma.

*Section of Otology, November 11, 1927*NEW HISTOPATHOLOGICAL FINDINGS IN THE EAR
IN LUES AND THE IMPORTANCE OF THESE
FINDINGS FOR THE GENERAL PATHOLOGY
OF THE EAR

(The paper is based on the histological examination of six cases of lues with defective hearing)

GUSTAV ALEXANDER
Vienna

The changes I have found in lues are related in many directions with the changes in the inner ear caused by other diseases: First, the content of the fat tissue in the inner ear, already observed in cretinism and now also found in lues. It may be that this fat tissue represents something like the low resistance of the organ which we call in German "Minderwertigkeit" (the low value of the organ). This finding can explain how it is that while in some instances the ear is diseased from lues in others it is not.

The finding of some secretion in the internal ear makes the luetic findings equal with the finding in otitis interna vasomotoria (Brunner); showing that in the development of internal ear lues the vasomotoric system is also an influence.

The finding of different degrees of atrophy in the cortis organum and in the nerve and ganglion apparatus in many cases of lues is equal with the changes in the inner ear typical of those caused by arteriosclerosis. We know, clinically and anatomically, that the internal auditory artery becomes changed very early. Very often the beginning of the arteriosclerosis is associated with ear symptoms,—otalgia angiosclerotica (Stein), bad hearing, and noises. The cause, when the ear is affected so early, must be seen in the fact that the internal auditory artery runs isolated and branchless as one of the thinnest arteries in the human body, nearly the length of three to four centimeters (30 to 40 mm.), and is then divided into end-arteries. We know that such an artery reacts very quickly to all kinds of direct and indirect injuries—therefore also to arteriosclerosis. The manner in which lues causes atrophy of the inner ear can therefore be in some cases only through endarteritis luetica.

The findings of ecstasia of the pars inferior of the inner ear and the sac formation in the vestibule in our cases of lues are the same as those found regularly in cases of Paget's disease. The cause of the ecstasia must be a change in the endolymphatic sac in the case of lues—as represented by luetic meningitis.

The findings of the complete or incomplete closure of the cochlear aqueduct in our cases of lues are the same as those found in a choked labyrinth caused by brain tumor. In the case of lues, the closure of the cochlear aqueduct is therefore the end-result of the luetic pachyleptomeningitis and encephalitis.

Of practical and theoretical value is the finding of gumma in the inner ear capsule in cases of lues, resembling the changes in otosclerosis. These findings demonstrate that the opinion that otosclerosis may be caused by lues is entitled to consideration, and this finding gives me a base for saying:

1. That in future I shall use antiluetic treatment with neo-salvarsan and salvarsan and hydrargyrum, and also the malaria treatment of Wagner in cases of otosclerosis.

2. This antiluetic treatment is indicated as a prophylactic measure for children with a positive heredity for otosclerosis through parents or other near blood relations.

3. This treatment may also be indicated as a treatment for pregnant women with otosclerosis, in order to prevent the progress of the ear disease during the pregnancy. It may also be that this treatment may prevent in the developing embryo the formation of an ear organ of low value.

4. This antiluetic treatment is also indicated for all patients with otosclerosis in whom the distance hearing is not below that for conversation. It is necessary, also, that in cases of otosclerosis the antiluetic treatment should be given in the earliest possible stage after the manifestation of the disease.

I have to mention still another fact of physiological importance. In one of my cases (No. 1), the distance for hearing was very low. The patient—whom I had known for years and whose ears I had repeatedly examined—had no hearing for sentences; he heard only very loud words spoken directly on the ear. I had formerly had the experience that such limited hearing cannot be caused alone by changes in the conductive apparatus but must also be combined with changes in the per-

ceptive or nervous apparatus of the cochlea. But the histological findings in my case clear up only a very low degree of nerve atrophy, and atrophy of the cortis organum, just in the beginning of the vestibular part of the cochlea. In all other directions of the cochlea the cortis organum was perfectly normal from the beginning of the basal coil to the tip. The same normal finding was shown by the cochlear nerve and by the spiral ganglion. We can make this histological diagnosis exactly because the preservation of the structure of the inner ear was perfect. This finding demonstrates that the marked diminution of hearing in this case was caused only by the changes in the bone capsule, and allows the generalization that extremely poor hearing can also be caused by changes in the conductive apparatus alone, without changes in the cortis organum and in the nerve ganglion apparatus.

*Section of Genito-Urinary Surgery,
November 16, 1927*

THE PRESENT DAY TREATMENT OF ACUTE
GONORRHEA IN THE MALE

ABRAM L. WOLBARST

In the successful treatment of acute gonorrhea, lies the entire problem of gonorrhea in the male. There can be no complications or chronic hangover if the acute infection is properly treated. There is no single method of treatment which has been generally approved; this accounts for the multiplicity of methods, all of which are valuable in certain cases, but no one can tell in advance whether a certain method of therapy will be useful or harmful in any given case.

One of the cardinal errors in treatment is the tendency to seek a hasty cure of the acute infection; this leads to over-treatment, which in turn predisposes to trauma and chronicity. The cure is the aim in view, not the time it takes to bring it about. It is not necessary to kill the gonococcus outright;

almost any chemical with antiseptic properties will kill the gonococcus, but to effect a lasting cure the chemical must not injure the tissue.

Internal treatment is limited to an alkaline solution and a copious intake of water. Recent additions to internal therapy, which have more or less value, are acriflavine in the form of enteric-coated capsules and pyridium, both of which have not yet demonstrated their ultimate therapeutic status.

Local treatment aims to destroy the invading organisms, but it should leave the tissues undamaged. Hydrostatic irrigations of permanganate of potassium should not be used in acute infections; they traumatize the mucosa and predispose to complications, particularly in the hands of the inexpert. Mercurochrome, acriflavine, metaphen, collene and similar preparations have been used as a substitute for the permanganate solution, but they are subject to the same criticism. In subacute and chronic conditions and in non-specific urethritis, hydrostatic irrigations are extremely useful.

Better results are attained with much less danger of trauma, by the judicious use of the modern silver salts, injected with the small hand syringe. Many of these are available. A weak solution in the beginning gives better results than the strong solutions usually recommended; as the case progresses and the inflammation subsides, the strength of solution may be increased, but never to the point at which it causes pain or irritation. The anterior urethra should not be distended with the solution; distension may injure the mucosa. Treatment should be begun at the earliest possible moment; nothing is gained by waiting.

It may be desirable to change from one silver preparation to another from time to time, because of the tendency of bacterial organisms to develop a form of "fastness" when attacked by the same chemical product continually; also because there are many strains of gonococcus, some of which react to one chemical while others react to another.

Persistence of gonococci after three or four weeks of treatment is suggestive of prostatic invasion, even though there be no clinical manifestations of such invasion. The prostate and seminal vesicles should be examined and appropriate therapy instituted, in these cases.

When the urine clears and gonococci can no longer be isolated, an astringent, preferably zinc sulphate, 1:200, is indicated; this is followed by moderate urethral dilatation and several weeks of observation without treatment.

Certain cases run along smoothly as anterior infections of mild type and suddenly show purulent urine in both urine glasses, indicating posterior involvement, usually without posterior symptoms. Careful massage of the prostate shows the presence of a low-grade chronic prostatitis and vesiculitis, probably non-specific in character. Urine voided after gentle massage contains much pus and detritus, but no gonococci. Appropriate treatment clears up this old infection, at the same time protecting the prostate and vesicles against extension of the acute specific infection from the anterior urethra. If these precautions are not taken in time, the inflammation extends to the posterior adnexa, with all the symptoms and tendencies of a posterior specific infection. It is therefore advisable to examine the prostate in every acute case and thereby prevent potential posterior invasion.

Additional methods of therapy have been devised within recent years, which, though valuable, have not yet established their permanent therapeutic status. They aim to utilize the natural forces of the body in resisting the attack of the invading organisms. The oldest is the use of vaccines, but the consensus of opinion is that vaccines are not of any particular value in acute gonococcal infections. Foreign protein therapy is more effective as a rule, the principal substances employed being sterilized or boiled milk, turpentine and typhoid vaccine, injected intramuscularly. Several modifications of this method have been employed with much success. Autoserotherapy utilizes the blood of the patient for reinjection, and is said to be effective, especially in the presence of complications.

Intravenous injections are used to stimulate the natural forces by the creation in the body of some substances, which in turn act on the invading organisms. Mercurochrome 220 is typical of the substances employed in intravenous therapy. Its permanent status is still unsettled. Acriflavine, and more recently metaphen have been similarly used, at times with striking results, but it is still too early to predict their ultimate place in the

therapy of acute gonorrhea. The same may be said of the original method of oxidation and reduction devised by McDonagh, of England, which has been highly praised and equally highly condemned.

Diathermy aims to destroy the gonococcus by the application of heat to the tissues and the stimulation of the natural forces of the body. In acute anterior infections, the method has not been as successful as in chronic conditions, especially with complications, in which condition it is of great value.

In acute posterior involvement, the less local treatment the better. Conservative therapy applied to the anterior urethra usually controls the posterior infection; in certain cases, intravesical irrigations with the large hand syringe are useful. Certain posterior cases are frankly malignant in character from the outset. They are destined for complications, and these usually occur, under routine treatment of the posterior urethra. As a prophylactic against the development of complications, nothing acts as quickly and efficiently as vasotomy. This not only cleans out the vesicles and vasa, but changes the entire aspect of the inflammation, giving it a more benign character. Diathermy also acts efficiently in these severe cases, but its action is slower and less reliable than that of vasotomy. Chemotherapy, as advocated by McDonagh, is said to abort severe prostatic infections with impending complications.

For acute seminal vesiculitis, nothing compares with vasotomy and diathermy. Personal preference is given to the former. Injection of Pregl's iodine solution directly into the infected seminal vesicles through the rectum, is practiced with success by Stelwagon.

Epididymitis is best treated with diathermy; when pus is present, Hagner's epididymotomy is indicated. Intravenous therapy also is employed, especially the use of sodium iodide alone or in combination with hexamamine. Non-specific proteins and vaccines have a large field of usefulness when this complication is present. Young has injected mercurochrome directly into the inflamed epididymis, while Luys, of France, has used the same method with electrargol, with success. Whatever therapy may be employed for the acute epididymitis, attention must be directed to the infected vesicles as soon as the epididymal in-

flammation has subsided; otherwise a chronic inflammation will persist.

Arthritis is treated in the light of a metastatic infection from the seminal vesicles. Vasotomy is the preferred therapy; its results at times are very startling. Diathermy also acts well. Stelwagon's injection into the seminal vesicles acts favorably on the arthritis. The treatment of acute arthritis is directed at the seminal vesicles primarily. Vaccines, foreign proteins, and intravenous injections have their place in the treatment. The main thing is to reach the infection in the seminal vesicles and the joint will take care of itself.

Summary

The high lights of modern therapy of acute gonorrhea are the following: Silver salts locally, copious water intake internally, supplemented if desired by an alkaline solution or one of the new chemotherapeutic preparations; avoid overtreatment at all times; examine the prostate in all acute cases for an old non-specific prostatitis; in posterior involvement, the minimum local therapy is the desideratum; acute complications may be averted by the employment of vasotomy and diathermy; diathermy is almost specific for epididymitis, vasotomy for acute arthritis and seminal vesiculitis. Future progress lies in the direction of utilizing the natural forces of the body to combat the bacterial organisms.

MODERN TREATMENT OF CHRONIC URETHRITIS

JOSEPH A. HYAMS

Chronic urethritis is due to causes which are practically all preventable. Education of the patient is the most important measure at our command, in preventing the complications and further dissemination of the disease as well as expediting its cure.

Rigid routine examination is essential, having constantly in mind the possibility of a serious underlying urogenital condition. The three most frequent causes of a chronic discharge are large calibre structure, infection of the urethral glands and prostatitis and vesiculitis.

Treatment is based on a knowledge of the location and extent of the disease. It often calls for the use of all our diagnostic acumen and therapeutic measures. The natural immunity of the patient is an asset, and constitutional treatment is often necessary to maintain it.

When gonococci are present, our first aim is their destruction by recognized therapeutic measures,—silver and silver salts, potassium permanganate, etc., irrigations, instillations, and heat. Do not instrument unless indicated, in the presence of gonococci.

Urethroscopy is important in clearing up of pathology of the urethra. Recent work by Joseph F. McCarthy, J. Ritter, and others, indicates that pathology of the seminal vesicles is not as common as previously taught and is localized to the ejaculatory ducts. Treatment of these structures may be necessary and advisable, and is worthy of further investigation.

THE ROLE OF THE GONOCOCCUS IN STERILITY

MAX HUHNER

The gonococcus itself does not cause sterility in either sex. It is only the pathological changes which it sets up in the genital organ of either sex, which is the cause of the sterility. There is absolutely no antagonism either between the gonococcus and the spermatozoon or between the gonococcus and the ovum. This has been experimentally demonstrated by me for the male as long as 14 years ago.¹ I placed semen containing live spermatozoa on a slide, mixing it up with virulent gonorrheal pus, without noting any change in the motility of the spermatozoa. Clinically this has been proved both in the male and female. A man suffering from an acute virulent gonorrhea may impregnate his wife and give her gonorrhea at the same time. A woman suffering from gonorrhea may become impregnated and bring forth offspring. Cases are on record, where a woman suffering from acute purulent gonorrheal salpingitis has been impregnated, showing that the gonorrheal pus, containing viru-

¹ Huhner, Max. *Sterility in the Male and Female*. Rebman Company, New York, 1913.

lent gonococci has no detrimental effect either on the ovum or the spermatozoön. Even prolonged contact of gonococci with spermatozoa does not appear to hurt the latter. It is not at all unusual for a man to marry, who honestly believes himself to have been cured of a gonorrhea. Yet such a person may harbor gonococci in his prostate and seminal vesicles years after all clinical signs of his gonorrhea have disappeared, and may impregnate his bride and infect her with gonorrhea, showing that the prolonged contact of spermatozoa and gonococci in the seminal vesicles do not interfere with the reproductive qualities of the spermatozoa.

The role of the gonococcus in the production of sterility consists therefore in its producing pathological changes in the reproductive organs in both sexes. Let me rapidly run over these changes.

In the male, starting with the testicles, I have found that gonorrhea will at times destroy the spermatogenic function of these organs, at least for the time being. This has been demonstrated by me in my experiments with aspiration of the testicles. I have found persons who have had children, and who later acquired gonorrhea, that during the attack, no spermatozoa were found in the testicles on aspiration. In other cases they were found, showing that the effect of the gonococcus on the testicles varies in different cases.

In the epididymi and vasa, the gonococcus sets up inflammatory changes which lead to permanent occlusion of the ducts. This is the most frequent cause of sterility in the male, and is so well known that further discussion is unnecessary. I wish to mention, however, that the inflammation may be so slight as not to cause any clinical symptoms, but enough to cause occlusion and so produce sterility. In these cases, condom specimens will always show absence of spermatozoa, while the fluid taken from the testicle itself by aspiration will show spermatozoa, demonstrating that the cause of the azoöspemia is in the tubes.

Theoretically, we might expect to find occlusions in the ejaculatory ducts, similar to those found higher up, but clinically such cases are exceedingly rare. This has been amply demonstrated by the probing and catheterizing of these ducts through the modern urethroscopes. Moreover in such condi-

infected partner. It has been supposed that the gonorrhea so alters the uterine endometrium that it becomes unfavorable for the nesting of the impregnated ovum. Nevertheless, pregnancy has occurred in the presence of a severe purulent gonorrheal inflammation of the decidua.

Coming now to the fallopian tubes, it is here where we find the chief cause of gonorrheal sterility. As is well known, the gonococcus causes an inflammation of the tubes which results in complete closure with consequent sterility. While this condition had been suspected for many years, it was not till the advent of the Rubin Test that it has been proved in so large a number of cases. The occlusion of the tubes as well as the Rubin Test are too well known to require further discussion. One word of caution, however, is necessary, and that is that there are many other conditions besides gonorrhea which may cause occlusions of the tubes. It should therefore be employed in every case of female sterility whether or not there is a history of gonorrhea.

Coming finally to the ovaries, we may briefly reiterate that here also it is not the gonococcus itself, but the pathological conditions brought about by it, which is the cause of the sterility. As a general rule, it is only when there has been produced such a productive inflammation, which completely imbeds the ovaries in masses of adhesions or causes such thickenings of its tunica, as to interfere mechanically with ovulation, that sterility due to gonorrhea results.

THE SURGICAL COMPLICATIONS OF GONORRHEA IN THE MALE

HOWARD S. JECK

In acute gonorrheal urethritis, the surgical complications fall chiefly into two groups, viz., (1) those of the pendulous urethra and (2) those of the deep urethra. Of group one the chief complications are: peri-urethritis, peri-urethral abscess, cowperitis, balanoposthitis, abscess of the urethral glands, spongeitis, cavernitis, lymphangitis and lymphadenitis.

Of group two should be mentioned: epididymitis, prostatitis, prostatic abscess, peri-prostatitis, peri-prostatic abscess, seminal vesiculitis, renal infections and the various metastatic lesions. Urethral stricture is common to both groups. Pelvic peritonitis and gonorrheal cystitis are both extremely rare.

The following complications, which are those most frequently encountered, are the only ones discussed:

Gonorrheal epididymitis may at times be confused with non-specific epididymitis, orchitis or torsion of the testicle. Treatment is surgical (epididymotomy) in six per cent. of cases. Non-surgical treatment consists of a properly applied adhesive plaster suspensory and rest in bed.

Prostatic abscess and peri-prostatic abscess—Exquisite tenderness, which persists, acute retention and fluctuation are the main diagnostic points. If the abscess is wholly within the prostate, the "sound" operation is indicated. If the abscess is peri-prostatic or both intra- and peri-prostatic, open operation (extra urethral) through the perineum should be done. External urethrotomy is performed only when the pathological process involves the urethra.

The diagnosis of *urethral stricture* may be erroneously made if the patient fails to relax and cooperate with the surgeon. The mistake in diagnosis is not discovered until proper relaxation is had by means of an anesthetic.

Uncomplicated strictures of the pendulous urethra almost *always*—uncomplicated strictures of the deep urethra almost *never*—require urethrotomy.

Abscess of the urethral glands (frenal) requires free incision from without in—not by intra-urethral approach.

THE USE OF DIATHERMY IN ACUTE AND CHRONIC GONORRHEA

LEO L. MICHEL

In reporting the results of clinical experiences with diathermy briefly considered, the action is primarily one of heat, in bi-terminal application of the oscillating current of high fre-

quency, causing the generation of heat within the tissues, between which the currents pass. The heat is equal at both terminals, and therefore inversely proportional to the size of the electrodes. The amperage should not exceed 100 milli-amperes per square inch of the larger electrode.

Former methods of applying heat in gonorrheal infections have been inadequate. Diathermy currents are under control, and may be mono-polar or bi-polar. The mono-polar (Oudin) is used for fulguration. The bi-polar current is used medically or surgically in gonorrhea. Surgically (less logically called Endothermy) this is a cutting current of use in such conditions as phimosis, dorsal slits, and pin-point meatus. It prevents metastatic infection by sealing off as it cuts blood and lymph vessels.

It is in the so-called *medical* application of bi-terminal diathermy that the high frequency current in gonococcic infections plays its most important role.

Acute Anterior Gonorrhea

In a series of 200 cases of acute primary anterior infections, diathermy was applied for one hour each, with every known applicator, but without encouraging results. Combined with intra-urethral injections, the disease was not especially shortened, and no particular advantage was observed. Where instruments were used intra-urethrally to apply diathermy, using precautions preceding instrumentation, complications were invariably noted in the acute cases. These observations differ from English and other observers.

Chronic Anterior Gonorrhea

In the chronic anterior group of cases, condylomata, papillomata, cysts, follicles, and infected crypts were easily destroyed. Diathermy applied through the dilating electrodes and Kollman dilator, in the soft and hard infiltrations, gave good results. Tight strictures responded better to the author's method of negative galvanism. Diathermy is applied to the posterior urethra, at the first suspicion of an extension of the infection. In this manner we usually prevent the distressing symptoms of an acute posterior infection, probably aborting the disease in this location.

Diathermy is of greatest use in the posterior infections.

Acute Posterior Gonorrhea

The pain of the acute posterior infections was completely controlled with a one hour treatment, applied to the prostate and vesicles through an especially devised Michel electrode, made by Wappler. Eighty-six cases of acute prostatic abscesses under treatment cleared up symptomatically. Not any of these cases required surgical intervention.

Chronic Posterior Gonorrhea

In chronic infections, the post-gonorrheal prostatitis and seminal vesiculitis gave better results with diathermy applied through posterior electrodes, urethral and rectal, combined with irrigation and massage than with any other treatment at our command.

Arthritis, Acute and Chronic

These arthritides oftentimes respond nicely to diathermy when diathermy is properly applied.

Epididymitis Acute

Diathermy usually controls the pain, but is *not* specific. It usually requires four to six treatments for full control of pain. Absorption of exudate was quicker than with any other treatment. The treatment was combined with vaccines, iodides, rest and support.

Attention is called to a complication sometimes arising with the first application of diathermy, especially in elderly men, a reaction simulating urinary fever, never seen to occur with daily treatments, therefore diathermy is applied daily to these cases.

Summary

The use of diathermy has resulted in the following:

I have not had successful results in acute anterior gonorrheal urethritis. Abortive therapy has been aided somewhat, but experience has been too limited. In the chronic or subacute anterior inflammations, we have obtained better results.

In the involvement of the posterior urethra, prostate and seminal vesicles, either acute or chronic, diathermy has given

brilliant results, surpassing any other form of treatment known to us. It is in these conditions, previously beyond the remedial measures of the attending physician, that diathermy has proven itself. I may say at this time that we have had no occasion to render surgical intervention in posterior gonorrhea, since utilizing diathermy in the manner stated.

At this time I can but touch upon the subject of diathermy in gonorrhea of the female. The primary principles are the same. The application alone is different. I may also say that in women it has been my experience that I can do more in less time, with chronic gonorrhea, than I could do formerly.

I may be permitted to state that by the use of a new electrode, devised by me, and made by Wappler, chronic endocervicitis is controlled in one or two sessions. At some future time I will dilate upon this subject.

Section of Ophthalmology, November 21, 1927

TRAUMATIC OCULAR PARALYSIS WITH RETRACTION MOVEMENTS

ARNOLD KNAPP

The patient, sixty years of age, had an ethmoid operation on his left side in June, 1926. He was then seen a few days later by Dr. E. Waldstein, who found a paralysis of the internal rectus on the left side. One year later I saw the patient, through the courtesy of Dr. Waldstein, and found the condition the same as it is at present. In the primary position the left eye is deviated outward 40° . In moving both eyes to the right, the left eye comes to a full stop in the median position, when there is a widening of the palpebral fissure and apparently a protrusion of the eye, together with a slight tendency of the eye to go downward. When the eyes are moved to the left the action of the external rectus is entirely one of retraction. The eye is pulled into the orbit and the palpebral fissure gets smaller. The sight and the eye ground in both eyes are normal.

Dr. Knapp thought that the condition could be explained by a separation of the internal rectus tendon, with union of this separation to the inner wall of the orbit by scar tissue, whereby no action of the internal rectus was possible; and through the fibrous band the relaxation of the internal rectus did not follow on attempted contraction of the external rectus, and the external rectus could therefore produce only a retraction movement.

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METHODS FOR PREPARING SUCCESSFUL EYE SPECIMENS GROSS AND MICROSCOPIC

LOUISE H. MEEKER

WARD H. COOK

(From the Department of the Laboratories, New York Post-Graduate Medical School and Hospital)

This paper is intended to outline an original method for the preparation of gross eye specimens and a method for microscopic sections that we find most satisfactory. The first has enabled us to augment our teaching equipment and the second to present faithful histological pictures.

1. *Examination*

The purpose of the laboratory examination of eyes is to study in detail the conditions recognized clinically.

To facilitate the examination in the laboratory the eye should be marked. The marking may be done by the operating surgeon before enucleation, by touching the bulb with silver nitrate near the lesions, or by using thread. Another way is to consult the pathologist and point out the pathological areas as observed in life. This latter plan is the better.

After enucleation the pathologist carefully marks the indicated areas to make certain that they are included in the microscopic sections. This is necessary because certain fixing fluids render the eye opaque at once and greatly obscure the landmarks present in the living eye.

2. Fixation

After the eye is marked the next step is fixation so that the picture as seen in life may be preserved unaltered. On no condition should the eye be opened before fixation (freezing is not recommended), for the entire contents of the bulb may escape.

Greeff (1) states in his "Guide to the Microscopic Examination of the Eye:" "The eye in virtue of its peculiar form and composition demands treatment differing in many respects from that sufficient for organs which are more uniform in structure and the precise relation of whose parts is less important to preserve."

The various fixing solutions in common use are unsatisfactory as Verhoeff (4) has pointed out with considerable emphasis. He stresses the frequent artificial detachment of the retina and shrinkage of exudates and ocular tunics after formalin fixation. He states that Zenker's fluid is an uncertain fixing re-agent and recommends mixing formalin with a weak alcoholic solution, adding a final word to the effect that this mixture is by no means a perfectly ideal fixing solution.

Greeff (1) nearly thirty years earlier had noted the "great shrinkage of the vitreous and almost artificial detachment of the retina" when Müller's fluid was the usual fixing reagent for eyes.

We have used Zenker's solution with 5% acetic acid and have added 10% formalin for the fixation of our eye specimens. Formol-Zenker is an old fixing solution but seems not to have been used for eyes. We find that it penetrates quickly, preserves all the ocular structures accurately and permits the later application of many histological stains. The solution should be freshly prepared because oxidation takes place rather quickly.

It has been our custom to prepare the fixing solution shortly before the enucleation. The fixing fluid should be about ten times the bulk of the eye, 110 cc.

Zenker's solution—95 cc

Formula: Acetic Acid (glacial)—5 cc

Formalin—10 cc

After the bulb has been immersed in the fixing solution about two hours small windows are cut in the sclera and the eye replaced in the fixative for 24 hours, then washed in running water

24 hours and placed directly in 80% alcohol. Razor blades are excellent for cutting the sclera. Cut the eye tangentially at opposite poles avoiding the planes to be studied later. Until the sclera is opened the eye always floats in the fixing solution. To insure uniform penetration it is, therefore, well to cover the specimen at first with a thin layer of absorbent cotton.

From now on the usual routine is followed as with any tissue. By our method of fixation the retina remains in proper position, the tissues do not shrink and all elements are well preserved. (Fig. 1).

3. *Sectioning*

After fixation is completed the eye is ready to be cut into sectors as planned from the beginning, that is, the pieces are cut out that are to be embedded in paraffin or celloidin. The cutting is done after the manner described by Greeff (1) and Verhoeff (4). Incisions are made in a plane parallel to the optic axis passing about 0.5 mm. inside the corneal limbus and just missing the lens. It is customary to section the globe in the horizontal plane unless there are lesions best studied in a different plane and to include cornea and papilla in the section with the special lesion to be studied.

The specimens we are showing have been embedded in celloidin by the slow method. After embedding in celloidin the usual microscopic sections are made and stained as may be needed.

Thick sectors are left over uncut and remain embedded in the celloidin. They are placed in 80% alcohol and as a rule either forgotten or thrown away in the course of time. These celloidin blocks become white and opaque and have no apparent value.

We have discovered, however, that these seemingly useless celloidin blocks may be reclaimed and made into excellent gross mounts useful for teaching purposes. This is accomplished by testing with oil so that the celloidin becomes clear and invisible while the section of the eye remains unaltered. The clearing of specimens is an old process. Spalteholz's (3) clearing method is well known.

Our method makes use of clearing oils following a suggestion in Guyer's (2) "Animal Micrology." So far as we know we

are the first to apply the method to unstained eyes embedded in celloidin for the purpose of making gross mounts.

4. *Clearing*

The process of clearing may be applied to new celloidin blocks or to old celloidin blocks, even those 20 years old. Several of our most successful preparations are celloidin blocks kept in alcohol about 20 years.

The method is as follows:

Cut block as desired, keeping as thick as possible. Thin blocks may curl and if this happens they must be re-embedded.

1. Place in 95% alcohol 24 hours to remove most of the water.

Subsequent steps admit of two procedures, one short (A) and one long (B).

A. *Quick Method*

2. Solution (95% alcohol 1/3)
(Oil of Thyme 2/3) 24 to 48 hours
3. Solution (Oil of Thyme 2/3)
(Castor Oil 1/3)

To remain in this until clear (one to several days).

4. Solution (Oil of Thyme 1/3)
(Castor Oil 2/3)
5. Castor Oil.

B. *Slow Method*

Castor Oil only for days, weeks or months or *until perfectly clear*.

The oil of thyme must be distilled until colorless (one to three times), and be kept in the dark. The castor oil must be as nearly colorless as possible; Baker's cold process, "Crystal Castor Oil" approaches whiteness more nearly than any we have been able to procure.

After the clearing process the celloidin is invisible and the eye restored to its appearance before embedding.

This method is not intended to replace other methods of preparing gross mounts of eyes. It is an added method and permits a double use to be made of the celloidin blocks: (1) Gross specimens, and (2) Microscopic sections of the same.

The cleared blocks may now be mounted in castor oil in the usual museum jars for eyes and placed in a special cabinet as

pictured. (Fig. 2). The blocks are suspended by German silver wires to frames of glass rod. The outlines beside each eye are intended to assist the student to recognize the striking pathology. The eyes are visible from both sides and by proper lighting and some magnification considerable information may be obtained. A background of ground glass gives a pleasing effect when artificial illumination is employed.

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TRAINING OF THE BLIND IN GERMANY

MISS BETTY HIRSCH

I certainly deem it a great privilege to be allowed to speak here to-night, as I know that only scientific questions are taken into consideration in these meetings, and I am by no means an expert in medical science. But as the work about which I am going to speak has been built up by the help of one of our greatest eye doctors, Professor Silex of Berlin, I hope you will be a little interested in the results which we have obtained.

When I was asked for the title of my speech tonight I forgot one word, and that was the word "adult," for I am not going to speak about the education of blind children or blind young people in institutions, as they are almost the same in all countries, and I have seen so much good work done in this direction while traveling around in this country; but I want to speak about the training of our blinded soldiers and blind adult civilians, as the condition of our adult blind persons in Germany has completely changed since the war.

I have been asked by some eye doctors to tell them my opinion as to how to prepare grown persons for their future blindness if their cases are hopeless, and as I have had in the past several years the opportunity of training hundreds of grown persons in this direction I may say that I can speak out of experience. But before I pass over to this subject, I want to say a few words about the word "blindness" itself. Do not become sad, because I am not going to tell you anything sad. On the contrary, I want to say that it is a great mistake to look upon blindness as misery. It is of course a handicap, but this handicap can be eased much more than the sighted people think if they do not themselves make the blind person unhappy, of course without knowing it, by pitying him instead of learning to understand his position and helping him to feel that he is a normal human being. Seeing persons only too often forget that life, with all of its interests and activities, does not come into us from the outside but that it must be created in our minds and brain. A person with healthy, normal, open eyes can go through life without realizing or comprehending the outer world or life itself, while a blind person usually has a clear picture of life and its contacts impressed upon his mental vision. I think it seems like "carrying coals to Newcastle" when I speak about this subject here in this country where you have a Helen Keller. Another example I would like to mention is our greatest musician of all time, Ludwig Von Beethoven, who composed the most divine music when he was perfectly deaf. Did this music come from outside into his brain, or did he hear it with an inner sense? I think this question answers itself.

I think if persons who have the gift of sight would realize this they would not find so much difficulty in preparing an adult person for future blindness. Even the great Professor Silex, who throughout his life has done so much good for his patients and for blind people, shrank from telling our soldiers the truth about their condition and very often sent them to me; and the task was sometimes not very easy.

After all of the experience which I have had in this direction I am of the opinion that a doctor as soon as he knows that there is no hope of saving the eyesight should begin to prepare the patient for his blindness, and not only that, but he should

try to get someone to begin the training of Braille and other things, so that the patient may become accustomed to this work before complete blindness sets in. I know from my own experience and from many other cases that this is a great help in such instances.

These were my thoughts when the cruel war began and the blinded soldiers came home from the front. At the beginning of the war I was in England and I stayed there in order to attend a course at the University of London, so I did not get back before the middle of September, 1914. When I arrived happily back in Germany I decided to devote my strength and the rest of my life to these unhappy men who had gone to the war healthy and as free and independent persons, and now came back home broken and blinded and did not know what to do. I found the first five war blinded in the private hospital of Professor Silex, and I went to him and asked if he would allow me to go and cheer his patients up a little and give them instruction in reading and writing. He willingly consented, and on November 22, 1914, I went for the first time to see these men. I found them willing to begin learning, and I taught them reading and writing, Braille, and typewriting. They cheered up very soon, and when this was known in the Ministry of War they sent us for the next few years all of the blinded soldiers who came back from the front. Later on they sent them to their different provinces. So we had throughout the war 600 of them in our school. There are in all 2700 war blinded in Germany. After they had learned reading and writing they then wished to learn other work and to go into professions and business life again. This created some difficulty, because Professor Silex and I soon realized that we could not put these men into blind institutions, homes or asylums, but the men themselves were a great help to us. We had people of all the different classes of society, different professions and different abilities, and we had to separate these into three main divisions. In the first group were men who had had higher educations, such as teachers, officers, students and so on. They were instructed in our school in Braille, German and other languages, ordinary typewriting and medical notation, and then they went to the different universities to study on. They graduated, got their

degrees and went into physicians' and Administration offices. The teachers we got with great difficulty into their former schools for seeing children where they work very successfully. They teach music, chorus singing, history, languages, etc.

The second group were the middle educated people who had been clerks or similar business men and who wanted to get into the business world again. They were trained as typists, stenographers and dictaphone operators. We made some little adjustments on the common typewriters which enabled the blind typists to do the work quite as perfectly as their seeing colleagues. We produced German commercial stenography in Braille and had a stenographic machine made for that purpose. Then there were many men who had been employed by the Post Office. The Postmaster General of Berlin gave us his help in getting these people into the Post service again. Some became telephone operators; some did other things, such as folding telegrams, and so on. One of the soldiers himself helped us to a new occupation. He had been a book binder before the war and now undertook mending documents. He got along very well, and was engaged in the office of the County Council in Berlin. After his service hours he came to the school and taught his comrades this work, and now we have eighty document menders in all in the Administration offices in different towns. Securing positions for our typists was very difficult, because of the prejudice of the employers. When we had trained eight typists we invited the Aldermen of the County Council of Berlin to come and see these men work. They were much surprised and praised the work, but when we asked them to employ some of them, one of the Aldermen said that there was not such a law yet, but another replied, "Then we must have one made," but the law was not made at that time (that was in 1916). Nevertheless, some days later they sent for two of the typists, and thus came about the introduction of this profession for the blind which is now so generally known in Germany. Then there were in this second division many who had formerly been farmers, and through the kindness of a Count we had for two summers the use of one of his castles, with the grounds, and gardeners who trained the men to do again their former work. Many of them then got a little settlement, with some acres of land which they tilled them-

selves. We were able to train only ten or twelve people in massage, because the doctors in Germany do not like this profession for the blind, while in England there are two hundred blind masseurs and eighty of the greatest doctors there recommend them to their patients. The few men whom we trained took their examinations amongst the seeing masseurs and secured positions in hospitals.

Then the third and largest division had to be considered. They were people without much education, who had been laborers, factory workers, etc., before they became blind. In this group also there was one of the soldiers who gave us an idea. He had been a blacksmith, and he told us that he would never do any work other than connected with iron. I happened to be teaching a little blind girl, the daughter of the Director of our great munitions factories, Spandau, Berlin, and I asked him to give me the opportunity of trying some work in these factories. I had to get the permission of the Ministry of War, and then I went to the factories, sat down amongst the laborers and tried many of the works myself. I showed the Directors that it was possible for a blind person to manage the work, and they engaged five of our people. Very soon there were more than twenty or thirty blind workers in all of the different factories in and near Berlin.

This was the beginning of a new era for civilian blind people too. After the war, when millions of men came home from the front to be employed there was great difficulty in finding work for the blind, but out of the more than one million heavily disabled men a union was formed and the men themselves brought before the Government a petition for a law covering the employment of disabled blind. The law was passed in 1919, covering war blinded soldiers. In 1923 there was an amendment to this law, whereby a provision was made for the employment of blind civilians. Afterwards accidentally disabled civilians also came under this law.

Here are a few paragraphs of this law:

All employers who employ at least twenty healthy people are required to employ one heavily disabled. For each fifty healthy employees additional, he is required to employ one more disabled.

Employers to whom this law refers are private enterprises and corporations and public institutions and Administrations.

The disabled who come under this law are persons who are at least 50% handicapped either by war or by accident in civilian life, and those who are blind, deaf and so on.

An employers who does not want to employ a disabled is allowed to give him a settlement of his own, or to put him in a a tenant.

The General After-care Departments for heavily disabled have to work together with the employers in the interest of the disabled. They have to consent if a warning is given to a disabled, and this warning has to be given at least four weeks before dismissal.

If an employer violates the requirements of this law he has to pay a fine of from one to one thousand marks. If a disabled violates this law the Department can withdraw the advantages of the law from him for a time.

The disabled choose men of confidence, who work together with men of the business staff and the men thus chosen work together with the General After-care Department in the interest of the disabled.

When this law went into effect it was wonderful to see how the blind civilians in Germany awoke to independence and self-reliance. They came to us and asked to be trained in the new vocations, so that they might secure work which would take them out of their former conditions, in which they had been dependent on charity, homes and asylums. The Employment Bureau at the Statistical Department in Berlin did a splendid work, the result of which you may see by the following table.

From 1919 to 1926 war and civilian blind persons were given employment as follows:

<i>War Blinded</i>	<i>Civilians</i>	<i>Nature of Employment</i>
81	106	Metal Industry
4	12	Chemical Industry
0	16	Paper and Cardboard Industry
0	5	Wood Industry
14	43	Food and Victuals
4	28	Textile and Clothing
2	11	Graphical Industry

<i>War Blinded</i>	<i>Civilians</i>	<i>Nature of Employment</i>
107	52	Offices
16	47	Professions (three)
6	194	Industries for the Blind
8	18	Mixed Professions
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Total	242	532
Combined Total	774	

This is certainly a good result when one thinks of the condition of these poor people before the war, and it is a great joy to see how much happier these blind people are who work amongst the seeing, make the same money and are considered as useful members of society.

At the beginning of the war when some of the blinded soldiers came home the Grand Duke of the Province of Oldenburg introduced the idea of training dogs as guides for the men who were suddenly dependent on their families or friends if they wished to move about. This training has been extended to a high degree, so that now sixteen hundred of our war blinded are guided by dogs, and blind civilians have also asked for these guides. In Oldenburg and in other places in Germany there are special buildings for this purpose; the largest is in Oldenburg itself. There are large kennels for the dogs, grounds filled with all sorts of obstacles and a home for the blind men. Shepherd dogs are brought to these places and seeing trainers do the first work. In about a quarter of a year a dog is trained. The seeing trainer works like a blind man and tells the dog what to do when coming to an obstacle. For instance, when there is a step the dog sits down and does not move until his master has examined the obstacle with his cane. When there is a post or a lantern or anything which might result in an injury if there were a collision the dog draws back and does not go on. If the master drops anything the dog retrieves it and puts it into his hand, and so on. The love of the dog and the blind master for each other is very touching, and the blind man mourns as if he had lost a member of his family when the dog dies or suffers an accident. Many of the blind men can get about only by the help of these dog guides. In the country and in smaller towns the dogs are very satisfactory, but in large cities at street crossings

where there is much traffic the men of course are sometimes obliged to ask for the help of other pedestrians. As a whole, however, the dogs serve very well indeed and the men would keenly feel the loss if they were deprived of their faithful companions.

Section of Obstetrics and Gynecology

INTRALIGAMENTOUS PREGNANCY (FULL TERM)

M. O. MAGID

Patient 26 years old, married two years. Menstruation began at 17 years, regular, 28 day type lasting three days, moderate amount and painful. She consulted me July 2, 1924, complaining of pain in the lower abdomen, more on the left side, and profuse leukorrhea. She gave a history of having had a dilatation and curettage one year previously. Physical examination showed a profuse vaginal discharge, lacerated infected cervix. The uterus was small, anterior in position, slightly limited. Both adnexa were palpable and tender.

On July 16, 1924, I performed a tracheloplasty. Her complaints were markedly relieved. On April 5, 1926, I was called because the patient had amenorrhea since February 20, 1926, nausea, vomiting, faintness and weakness; these symptoms having lasted about two weeks, mostly in the mornings. Physical examination revealed an enlarged soft uterus. Adnexa could not be felt. There was no tenderness in the fornices. On April 16th the patient began to bleed and had some abdominal pains. I sent her to the Bronx Hospital with a diagnosis of threatened abortion. This diagnosis was confirmed by other members of the staff. The patient left the hospital in ten days, all pains and bleeding having ceased.

The pregnancy continued without serious complaint except for a general weakness and morning nausea. Quickening occurred in the latter part of July. The urine had been negative; the blood pressure 120 systolic over 80 diastolic varying very

little up to October 5, 1926, when it rose to 140 systolic and 90 diastolic. The urine then showed heavy trace of albumin. The lower extremities showed some swelling. On October 27th the urine almost boiled solid and showed red blood cells and many pus cells. The blood pressure rose to 150 systolic over 100 diastolic. The patient complained of severe headache and insomnia.

On November 1, 1926, the patient entered the Hunts Point Hospital. Here, with enforced rest in bed, and with proper dieting and nursing, she began to improve in kidney function and the blood pressure came within the normal range. The headache and insomnia disappeared. Examination of the abdomen showed the fetus in the transverse position, the head lying on the left side. The fetal heart could be heard at a point to the right and a little above the umbilicus.

During the night of November 7th the patient had severe pains coming at regular intervals. Vaginal examination showed the cervix was not obliterated, was soft and os was patulous. No definite presenting part could be ascertained. The patient was comfortable the next day, but in the evening she complained of not having felt any fetal movements during the entire day. At this time the fetal heart was not audible at the point previously marked nor at any other part of the abdomen.

Even though the fetus was not viable, abdominal section was decided upon as the only safe and quick means of relieving this patient, because of the type of pelvis she had (generally contracted), malposition of the fetus and her pre-eclamptic state.

On November 9th, in opening the abdomen I found, instead of the uterus, a tumor mass on the left half of which were three large venous sinuses running vertically. The omentum was markedly adherent to the anterior surface of the tumor. In separating the omentum, several large blood vessels were seen to enter the wall of the tumor. Incising the tumor to the right of the sinuses, a cavity with a thinned-out wall was entered. The fetus, which showed early signs of maceration, was removed. The cavity collapsed, the umbilical cord led down to the bottom of the cavity. The enlarged uterus was in evidence to the right of the median line. The patient was bleeding actively from the sac. The placenta, being partially detached, was entirely re-

moved and a large gauze pack was put to the bottom of the cavity to temporarily control the bleeding. The broad ligament was ligated and as much of the leaves cut away as was safe on account of the intestines being adherent to the posterior layer. What remained of the cavity was repacked and the abdominal cavity was closed. Stimulation and forcing fluids by hypodermoclysis helped to overcome the shock. Two and a half days later the patient expelled a decidual cast from the uterus. The patient was discharged December 22, 1926.

PATHOLOGICAL REPORT

Placenta: Weight 520 gms. is full formed placenta with portions of membrane and cord. Placenta is 15 cm. by 12 cm. On fetal surface near the insertion of the cord, which is central, can be seen an area about the size of a silver dollar, of apparent mucoid degeneration. On the attached surface can be seen scattered areas of fibrosis. The placenta is made up of two halves and seems as though it were folded on itself. The cord is 38 cm. long. In addition to the placenta is a mass of tissue about 5 cm. square and 1-2 cm. thick. This may be part of broad ligament or thinned-out tube or ovary. A third mass consisting of a piece of omentum was connected to the broad ligament opposite the placental site.

Microscopic Examination

Placenta shows areas of necrosis alternating with normal areas. In the necrotic areas can be seen thrombosed blood vessels. Section through the mucoid area shows mucoid degeneration.

Second piece of tissue cannot be diagnosed histologically as to its being tube or ovary. It shows hyperplasia of smooth muscle fibre with formation of new blood vessels.

Omental tissue also shows new blood vessel formation.

Fetus

Male, weight 5 lbs. 14 oz. The right side of the head is flattened, eliminating the facial outline, coming to a sharp ridge extending from the forehead to the chin; the left eye is protruding; the mouth is distorted; both upper and lower extremities are deformed. Evidence of beginning maceration on trunk quite marked.

Decidual Cast

Specimen consists of red friable mass, oval shape, 8 cm. long by 4 cm. wide. Areas of hemorrhagic necrosis.

POINTS OF INTEREST IN THIS CASE

1. Presence of chronic endocervicitis with periadnexitis causing tubal distortion, thus predisposing patient to ectopic pregnancy.
 2. Threatened abortion (?) with faintness continuing for two weeks.
 3. Continued good health until eight months of pregnancy.
 4. Pre-eclamptic state.
 5. Transverse position of fetus.
 6. Type of pelvis.
 7. Abdominal section for non-viable child.
 8. Placental insertion.
 9. Decidual cast.
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POST PARTUM ECLAMPSIA WITH RECOVERY;
DEATH FROM CEREBRAL HEMORRHAGE AND
ENCEPHALOMA LACIA LIMITED TO THE
LEFT FRONTAL LOBE—A CASE REPORT
AND REVIEW OF THE LITERATURE

JOSEPH BINDER

This lesion is sufficiently rare to warrant recording. Of interest at autopsy were relatively mild renal and hepatic lesions with evidence of healing of the latter.

Patient admitted 12 hours post partum, after many convulsions. Deep coma with a complete picture of eclampsia. Treatment included the exhibition of phlebotomy, magnesium sulphate, intravenous glucose, morphine, colonic irrigation and blood transfusion, with clearing of the eclamptic picture. Five days later patient became delirious, subsequently developed symptoms of cerebral irritation, and died on the 16th day, post partum, of bronchial pneumonia and pulmonary edema.

Autopsy showed congestion and edema of the brain, with encephalomalacia of the left frontal lobe; acute parenchymatous

degeneration of the myocardium; congestion and emphysema of the lungs, with bronchial pneumonia; chronic fibrous pleurisy; acute parenchymatous degeneration of the liver; acute parenchymatous degeneration of the kidneys; congestion of the spleen.

The clinical course and cerebral diagnostic signs are discussed, stressing the paucity of basis for accurate diagnosis of the cerebral lesion. The latter is believed to be due to the coalescing of multiple focal hemorrhages and necrotic areas.

The literature is carefully reviewed, noting that while various authors report the occurrence of cerebral hemorrhage in eclampsia, none specifically describe the precise type of lesion within the substance of the frontal lobe presented in this case.

The case illustrates the not uncommon occurrence of cerebral hemorrhage in eclamptic patients, the possibility of coalescence of many small contiguous foci into one large necrotic area and the fact that such a lesion occurring in the frontal lobe may give no characteristic diagnostic picture.

RECENT ADVANCES IN OBSTETRIC TECHNIC

PAUL TITUS, Pittsburgh

The members of this Section of The New York Academy of Medicine are so thoroughly familiar with the more important recent developments in obstetrics that one hesitates to bring before them such a subject as this. Indeed the fact is quickly brought out that many of these advances are being originated by members of this very Section.

Nevertheless, as attempt to present a number of them in review by means of illustrations rather than to undertake a critical and formal discussion of any one or two of them seemed to me a desirable departure from the usual technical paper.

These slides which are to be shown were prepared originally for the instruction of internes and nurses and therefore are somewhat elemental; but they have this merit that the drawings are originals and with only a few exceptions have never been published, while two of the motion pictures have never before been publicly shown.

Sterility is discussed in connection with the technic of tubal insufflation (Rubin's test) and the injection of the uterus and tubes for x-ray visualization.

Certain original blood sugar curves in eclampsia which establish the convulsions as hypoglycemic reactions are shown (recently announced from our clinic) and are followed by slides and a motion picture reel depicting the development of intravenous injections of glucose to the present point of a new timing and heat-regulating apparatus. This treatment continues to be advanced for hyperemesis gravidarum and eclampsia, the glycemia curves being shown to indicate that it is no longer empiric. Methods of proctoclysis are also illustrated.

The administration of the Gwathmey rectal analgesia during labor is shown by motion pictures.

The proper technic of catheterization and of vaginal examination before and during labor, and so-called "hand-grips" on the advancing head during delivery are shown; and a brief discussion of episiotomy followed by perineorrhaphy is outlined by still pictures.

The lower uterine segment Cesarean section is presented by still and motion pictures.

Section of Laryngology and Rhinology,
November 23, 1927

THE LOCATION OF THE FOCUS IN OPTIC NERVE
DISTURBANCES FROM INFECTION

LEON E. WHITE
Boston

Some focus in the body is responsible for the optic nerve lesion arising from infection. Invasion is through the blood stream. The accessory sinuses supply but an insignificant number of the foci. Most of the foci are found in the teeth and tonsils. The sinuses, from their priority of investigation have occupied the attention of rhinologists too long, to the exclusion

of other more frequent seats of infection. Much can be learned from the general medical man on the best methods of investigating focal infection. Dental infections are easily overlooked. An expert odontologist is essential in a successful search for dental pathology. Devitalized teeth are a potential source of infection. Tonsils are a frequent cause of infection and should be removed when at all suspicious, if no other foci are found. Among the sinuses, the antrum is the most frequent seat of infection. Thickening of the antral mucosa without secretion may be a sufficient focus to warrant surgical intervention. Definite infection in the other sinuses should be eliminated, but this is of rare occurrence. Marked nasal blocking should be removed. Ventilation of the sphenoid as a therapeutic measure is rarely indicated but is still advocated when optic atrophy is imminent. The infection may be in remote regions of the body. The focus may be found in the appendix, gall bladder, prostate, fallopian tubes, genito-urinary or intestinal tracts. Systemic infection following influenza, scarlatina, etc., may be responsible for the optic nerve lesion. Local treatment is advocated in addition to the removal of the focus.

Normal vision was obtained in 63 per cent. of the cases undergoing operations, while 20 per cent. improved. In the remaining 17 per cent. which were chronic, further loss of vision was prevented. The ethmoids were opened but once, the sphenoid twice, and the antrum four times. Over 80 per cent. of the cases had infected teeth or tonsils, or both.

Section of Pediatrics, December 8, 1927

AURICULAR FIBRILLATION IN CHILDREN; ITS RELATION TO RHEUMATIC HEART DISEASE

SIDNEY P. SCHWARTZ
MORRIS M. WEISS

Auricular fibrillation in children is not as rare as a survey of the literature would seem to indicate. On the children's service at the Montefiore Hospital, 14 of a total of 71 children with

chronic rheumatic heart disease showed this type of irregularity at some time during their stay in the hospital. This was 5% of all cases showing auricular fibrillation from all causes seen at the hospital during the same period of time. Fibrillation occurred in six of the children at the height of an exacerbation of rheumatic fever.

Clinically, the cases may be divided into three groups; (a) the paroxysmal type, (b) the terminal type, (c) the chronic or permanent form. In this group studied, one case was of the paroxysmal type, four were terminal and the remaining nine were of the permanent form.

The discovery of auricular fibrillation in children is dependent on the care with which the heart rhythm is studied. The development of the arrhythmia seems to be associated with (a) active rheumatic carditis, (b) mitral stenosis, (c) the administration of digitalis in excessive amounts.

The differential diagnosis of this irregularity is (a) from a marked sinus arrhythmia which is very common in children (b) from the irregularity caused by auricular and ventricular premature beats, (c) from the dropped beat phenomena due to partial heart block, and (d) from the various tachycardias. The electrocardiogram is of invaluable aid in the diagnosis.

The paroxysmal and terminal type of auricular fibrillation do not admit of any rational therapy.

In cases with permanent auricular fibrillation the problem is to maintain the circulation, to prevent breathlessness, decompensation and the accumulation of fluid. This is done with rest and adequate digitalisation. The restriction of fluids and the judicious use of Salyrgen in 1 cc. doses repeated at 24 hours is of great help in preventing the accumulation of fluid.

Despite the use of these methods, the prognosis is very grave. Of our series of 14 children, six died within one week of the onset of fibrillation, three died within one year, one lived 20 months, another four years and another has reached the adult stage but he is a badly crippled cardiac.

UROBILINURIA IN CHILDREN WITH HEART DISEASE

M. H. EDELMAN

The author calls attention to the increased output of urobilin in the urine in the presence of certain diseases and alterations of body conditions. The report concerns itself with urobilinuria in heart disease of children.

Using the method of Elman and McMasters for urobilin estimations the author has designated quantities of less than 3 mgm. per 100 c.c. as normal, and quantities of 3 mgm. or more per 100 c.c. as pathological.

Attention is called to the fact that cardiac decompensation results in passive congestion of the liver, with consequent hepatic dysfunction and resultant urobilinuria. The writer estimates the severity of decompensation by the amount of urobilin in the urine at any given time in the course of the disease. He is also enabled by these estimations to gauge the amount of recovery at any period, and guide himself in the subsequent management of the affected child. This is substantiated by the increased urobilinuria and the simultaneously poor clinical state of the child which resulted from getting the cardiac child out of bed in the presence of a urobilinuria, even though the pulse, temperature and leukocyte count were normal. Urobilinuria also resulted from operative procedures instituted before a return to normal levels.

Five hundred and eighty-four cases obtained from children admitted to the wards and cardiac clinic of the pediatric outpatient department of the New York Post Graduate Hospital were divided into four groups as follows:

- I. Control group—350 cases admitted for tonsils and adenoids.
- II. Comparative group—32 non-cardiac hospital cases.
- III. Ambulatory group—152 cases.
- IV. Decompensated group—50 bed-ridden cardiac cases.

The greatest number of urobilinurias occurred in the decompensated group (88%), next in the ambulatory group (26%), and least in the control group (4%). Urobilin reactions occurred in 12 of 14 children in the decompensated group sub-

jected to operations such as tonsillectomy, transfusion, teeth extractions, myringotomy and bronchoscopy. In 50 cases of the control group, only one postoperative urobilinuria was observed and no reactions in five cases of the ambulatory group.

Coincidental complications such as gastric upsets and upper respiratory infections, in the course of heart disease also caused increasing urobilinuria.

The author stresses the importance of urobilin estimations in the management and care of the cardiac child.

Section of Neurology and Psychiatry,
December 13, 1927

CASE 1—VEGETATIVE INSTABILITY AND ITS
RESPONSE TO TREATMENT

GEORGE HYSLOP

The patient is a man 23 years of age whose past history is of no consequence. In 1924 he was troubled with eructations and frequent movements. These symptoms were relieved by diet and hygiene modifications. In 1925 he had nervous attacks in which he noticed shortness of breath and a constriction in the throat. He was given tincture of belladonna for this and shortly afterward had an attack of palpitation with rapid pulse and from then he worried about his heart. He next found that he began to feel fatigued upon standing long. He grew gradually unable to stand any physical exertion and had sudden attacks of vertigo and his heart constantly beat very rapidly. Upon physical exertion, palpitation and acceleration of his pulse was much greater. There was no loss of weight nor change in sleep. He usually felt good in the morning but by the end of the day was exhausted. Sexual desire decreased in frequency.

He enjoyed his work, had normal interests and recreation, and there was no abnormality of his sexual life.

He was under treatment by various physicians without re-

ceiving any benefit. However, iodine had decreased his pulse rate. In June, 1927, a basal metabolism of plus 65 was found. Absolute rest was enjoined.

The patient came to me about July 1st, 1927. Physical examination showed hypotrichosis and visceroptosis with a ptosed heart. The skin was moist, musculature had poor tone, and the skin stroking test showed a very marked prolonged red line. There were no signs of hyperthyroidism—tremor or eye signs. The pulse and blood pressure response to position and exercise were of interest and indicated poor vasomotor tone. The pulse at rest was 96, on standing was 130. Blood pressure at rest was 134/76 and on standing was 114/80. Hopping raised his pulse to 150 without elevating the blood pressure.

Ephedrin $3/4$ gr. three times a day, a high fat diet, cod liver oil, and passive exercises with abdominal massage were prescribed.

The ephedrin slowed the pulse but caused a peculiar feeling at the chest and a pounding in the heart. The dose was reduced to $3/8$ gr.

By the first of August the patient felt an increase in energy and was troubled with neither palpitation nor unduly rapid pulse. Examination, however, showed as yet no objective change.

By September 1st the digestive symptoms had disappeared, the patient was not troubled at all with circulation and he had become able to perform moderately strenuous exercises without ill effects. He had gained four pounds in weight and observed that this was his first improvement in over two years. The pulse and blood pressure responses now showed improvement. The pulse when recumbent was 96 and on standing was 120. Blood pressure when recumbent was 120/80, when standing was 112/80.

On November 16th the patient had no complaints except that at the end of a hard day he would feel slightly tired. There was an additional increase of six pounds in his weight. The heart was no longer ptosed. His muscles and skin vasomotor status were normal. The pulse and blood pressure responses were normal. The basal metabolism was reported as plus 20.

Comment

This patient is presented because of the unusually high basal metabolism not due to thyroid disease, and also because of the effects of ephedrin on his pulse rate.

The clinical picture might perhaps be termed Neurocirculatory Asthenia. This type of patient is often difficult to classify because of the frequency with which the physical complaints reflect an emotional cause, and often these patients are regarded by neuropsychiatrists as psychoneurotic. This patient's anxiety about his heart is a perfectly natural thing. In this instance there was no determinable psychogenic basis for the symptoms and the concern over the palpitation was alleviated somewhat by reassurance, but chiefly because the treatment instituted was successful in combating symptoms.

I do not wish to assert that the treatment prescribed here is the only possible successful treatment.

CASE 2—FOCAL EPILEPSY DUE TO CHRONIC SPHENOID SINUSITIS

GEORGE HYSLOP

The patient is a woman age 31. She has been troubled with progressive deafness in the right ear for about five years. Routine measures were unsuccessful in combating it. She was not subject to nose and throat infection.

On April 15th, 1927, while talking on the telephone she became suddenly unable to say the words that she wished to speak. There was at the same time a numbness and tingling in the right hand. For about twenty-four hours she was unable to speak at all but could understand what was said to her. At the end of forty-eight hours speech had improved. She came to me on April 18th, 1927, and in addition to the above symptoms said that on April 11th a head cold appeared and was accompanied by headache localized in the temples and over the vertex. There was also occasional blurring of vision.

Physical examination revealed a slight hesitancy in speech with anomia, a diminution of the right wink reflex and a ques-

tionable right plantar response. Fundi, visual fields and acuity of vision were normal. There was no fever.

In the next few days nasal discharge and sneezing appeared and her headache and speech defect improved. There was a slight but definite facial weakness by April 23rd.

Examination of the sinuses by Dr. Hirst on this date revealed surprisingly badly diseased sphenoid cells. Exenteration of the sphenoid and ethmoid cells was done the next day.

The necrosis of the sphenoid cells indicated that they were chronically diseased. Local symptoms stopped soon after this operation, and the slight signs of focal brain disturbance have not recurred.

We have seen at Bellevue Hospital a few cases of temporal lobe symptomatology due to chronic sphenoid disease. The pathology in this patient is osteomyelitis of the sphenoid cells and extension of inflammation with the meningeal reaction over the tip and undersurface of the left temporal lobe. The patient was fortunate in not having developed either a brain abscess or a diffuse infective meningitis. The absence of retrobulbar neuritis and uncinata phenomena is perhaps worthy of comment. The localization in the temporal lobe is based upon the type of aphasia, the sensory aura in the right hand, and limitation of motor weakness to the facial muscles.

AN ANALYSIS OF 331 CASES OF HEAD INJURY IN CHILDREN WITH ESPECIAL REFERENCE TO END RESULTS

FENWICK BEEKMAN

From an analysis of 331 cases of head injury in children with a follow up report of 234 cases the following conclusions were drawn:

As a rule children stand severe injuries better than adults, as their resistance to damages to the body and their reparative powers are better. This is due to the fact that their bodies are young and they have no other pathological lesions to act as handicaps. This is apparently true of head injuries as well as others.

The fact that the dura is not strongly attached to the bones of the vault and that the vessels of the dura lie in comparatively shallow grooves in the inner surface of the skull, prevents laceration of the dura and brain in fractures of the vault, accounts for the rareness of extradural hemorrhages and allows diffuse separation of the dura from the bones in hemorrhage in the extradural space, the blood often escaping from this space through a fracture line and forming a hematoma under the scalp and thereby relieving the brain from compression.

Fractures of the vault may be frequently overlooked, as in many cases there are few, if any, symptoms, though hematomas of the scalp frequently overlie the fracture line.

The extent of a fracture line of the vault is of no prognostic value for the severity of the cerebral injury.

A simple depressed fracture of the skull is not in itself an indication for operative interference.

Compound depressed fractures are more serious than simple depressed fractures, not only because of the danger of infection that may follow, but because they more frequently produce lacerations of the dura and brain. In operating for compound depressed fracture, bone fragments should be replaced, if possible, so as not to leave a deficiency in the skull.

Fractures of the base of the skull in children may be overlooked for the lack of clinical symptoms.

Injury to the brain is more commonly found accompanying fracture of the base than fracture of the vault. This is especially the case in fractures of the middle fossa.

Symptoms resulting from brain injury clear up rapidly after the first forty-eight hours in the cases that recover; in those that die, death usually takes place in the first two days.

Symptoms of meningeal irritation without actual meningeal infection are often seen. Meningitis follows fractures of the anterior fossa more frequently than of any other part of the skull.

About 23 per cent of children suffering from head injuries have some type of sequelae, but few of them last. Those having symptoms due to permanent injuries are less than 5 per cent. As a rule it can be stated that sequelae are present in direct relation to the severity of the damage produced by the injury.

Fractures of the vault have a lower morbidity than those of the base, especially those of the middle fossa.

The symptoms complained of in the sequelae are more often of a subjective or emotional type than those of an objective type caused by a definite lesion. Headache is the commonest complaint. It was found quite as commonly in those with slight injury to the brain as in those with severe injury. It almost always clears up within a year after the accident.

Emotional instability is seen frequently. This varies anywhere from marked nervousness to a behaviorism which is a total change from the child's former character. These latter symptoms are found more frequently in those children who suffered from a more serious injury to the brain.

Conservative treatment appears to give the best results in head injuries in children. Operative procedures undertaken without definite indication are to be condemned.

PATHOLOGIC CONDITIONS COMPLICATING FRACTURES OF THE SKULL

B. M. VANCE

The pathologic lesions caused by fractures of the skull were classified most conveniently according to the cause of death. They were subdivided into four categories.

1. Deaths due to cerebral concussion or its sequelae, such as exhaustion and terminal pneumonia.

2. Deaths due to cerebral compression caused by:

a. Subdural hemorrhages, which in most instances were due to contre-coup lacerations of the brain, and to a less extent to direct lacerations of the brain. Rarely the hemorrhages resulted from the tearing of tributary veins to the superior longitudinal venous sinus, or from the tearing of old adhesions of the brain to the dura, or from laceration of the dura and the middle meningeal artery in such a way that the artery bled into the subdural space.

In some cases the laceration of the brain at their logical lesions of cerebral compression without any measurably true of head injuries and al hemorrhage. At times the volume after

the fracture, and this phenomenon has been designated as oedema of the brain.

b. Epidural hemorrhages, which were due to lacerations of some blood vessel on the outside of the dura by the sharp edges of the fracture. The middle meningeal artery was torn in most instances, while a few cases were recorded of laceration of the lateral venous sinus and the anterior meningeal artery with the formation of an epidural clot.

3. Deaths due to suppurative meningitis and other forms of intracranial sepsis. The most common form was suppurative leptomeningitis, with a few examples of suppurative pachymeningitis interna and externa, brain abscesses, and septic thrombosis of the venous sinuses.

4. Deaths due to miscellaneous conditions. These included deaths from post-operative shock, a death from hemorrhage during a craniotomy because of a lacerated superior longitudinal sinus, and deaths from epileptiform convulsions associated with old adhesions of the brain to the dura. A number of cases died as the result of injuries elsewhere in the body. In other cases death was due to a natural cause or some other condition not associated with the fracture of the skull.

The fractures of the skull were classified so as to designate the anatomical form and location of the fracture, and to indicate in a general way the direction and the intensity of the force which caused the fracture. The subdivisions were:

1. Fractures of the Vault and Base.

A. Anterior Location.

a. Linear Fractures.

b. Composite Fractures.

B. Lateral Location.

a. Linear Fractures.

b. Composite Fractures.

C. Posterior Location.

a. Linear Fractures.

b. Composite Fractures.

2. Fractures of the Vault alone.

a. Linear Fractures.

b. Composite Fractures.

c. Depressed Fractures.

Lantern slides illustrating different fractures of the skull, and some of the intracranial complications which attend these injuries, were shown.

Section of Medicine, December 20, 1927

STUDIES IN BLOOD BILIRUBIN AND ITS VALUE
AS A ROUTINE MEASURE, WITH A REPORT
OF 500 CASES

JOSEPH S. DIAMOND

The multiplicity of the normal physiological functions of the liver renders it exceedingly hazardous to single out one special functional test as a diagnostic measure upon which we may base the recognition of abnormal liver function. It must be admitted, however, that bile pigment formation is one of the important functions of the liver and it has been found by experience that a high blood bilirubin is frequently associated with other functional disturbances.

The van den Bergh method of bilirubin estimation in the serum has the advantage over other methods in that it is uninfluenced by hemolysis and by the presence of luteins and lipochromes which are introduced with the vegetable foods, eggs and fats, substances which in themselves cause yellow discoloration. This method also affords a differentiation between the types of jaundice through the direct and indirect reactions.

The material herein reported is collected in part from Bellevue Hospital (third medical division), Sydenham Hospital, and ambulatory cases consisting of office patients.

Hepatic Toxemia

The most valuable information was obtained from a routine examination of the chronic ambulatory patients who presented a certain train of toxic symptoms simulating, in the main, the functional neuroses. There were 28 cases, chiefly of young adults, who complained of fatigability, general indisposition,

loss of ambition, nervousness, some digestive disturbances and in some foul breath and coated tongue. These gave definite evidence of disturbed liver function as indicated by the high blood bilirubin in the latent icteric stage, varying from 1.5 to 4.5 units (7.5 to 22.9 mgm. per 100 c.c.). The urobilogen in the urine was also found to be high. Other pathological conditions in the digestive tract or in the hemopoietic system were excluded. A history of a digestive upset at the onset of the attack was obtained in many. The acute indigestion and vomiting was induced by the eating of canned fish or meats. I believe that in this group we have a definite clinical entity of hepatic toxemia brought about by putrefactive protein foods. Without the aid of the modern clinical methods this condition would be unrecognized and untreated. Contrasting with these, there was a large group of the psychoneuroses, the vagotonias, gastric neuroses, anxiety states, etc., comprising in all 63 cases, in whom the blood bilirubin estimation was normal and could not be accounted for on the basis of hepatic toxemia.

The increased blood bilirubin must be regarded as an index of a more generalized liver disturbance including an interference with the intermediary protein metabolism such as the synthesis of the amino acids and the detoxication of amino bodies from the intestinal canal, which disturbance is probably responsible for the toxic symptoms.

The treatment has been chiefly eliminative and dietetic. The administration of calomel, salines, bile salts, as well as a diet rich in carbohydrates, and restrictions of animal proteins are indicated.

The importance of the early recognition of these hepatic disorders cannot be over-estimated for it is very likely possible that such states may be the precursors of chronic liver states such as the cirrhosis. Those treated early showed marked improvement, the blood bilirubin also returning to normal, while in the more chronic cases, both the symptoms, as well as the high serum bilirubin, tend to persist.

Migraine

In 38 cases of the typical hemicrania, as well as the abdominal migraine, the blood bilirubin was found to be high in 90% of the cases varying from 1.0 to 5.0 units (5 to 25 mgm.).

There appears to be some analogy between migraine and Widal's hemoclastic crisis and they may be regarded as an allergic manifestation resulting from the inability of the deficient liver cells to metabolize animal proteins.

Cholelithiasis and Cholecystitis

There were 56 cases of cholelithiasis and 98 cases of cholecystitis. In this large group, the estimation of the blood bilirubin was only of value during an acute biliary attack, when the bilirubin would rise from 2.5 to 4.5 units (12.5 to 22.5 mgm.). Thus the rise during the acute attack served to differentiate them from other forms of abdominal colic such as renal, gastric, pelvic; also from tabetic crises and coronary disease, in which conditions the blood bilirubin estimations remained low.

Catarrhal Jaundice

There were 18 cases of catarrhal jaundice with readings varying from 9.0 to 25.0 units (45 to 125 mgm.).

Frequent observations of the blood bilirubin curve in cases of jaundice will help us recognize the character of the disease, whether obstructive, requiring surgery, or a non-surgical toxic condition. In toxic icterus, however, the curve may rise suddenly during a remission of the disease. Also in the complete obstructive stage, as in carcinoma of the head of the pancreas, the bilirubin may drop after a while to a lower level and remain there stationary. The presence of duodenal bile is not conclusive in ruling out an obstruction of the common duct for in the late stages of carcinomatous growths, ulcerations may take place and allow bile to pass through into the duodenum. In the differential diagnosis between the obstructive and toxic jaundice, daily studies of the urobilogen in the urine will help us far more readily to differentiate these conditions. Its presence in the urine in appreciable amounts speaks invariably for catarrhal or toxic jaundice. In the obstructive types, the urobilogen in the urine is always absent.

Salvarsan Icterus

In the treatment with arsphenamine group, it is important to study the bilirubin contents of the blood before each treatment and note the effect on the liver. The arsenical should be discontinued if the bilirubin remains high. In one instance,

after two treatments with neoarsphenamine, a delayed reaction ensued with the developing of an intense jaundice, the bilirubin reaching 45.0 units (225 mgm.). The patient remained gravely ill for two months.

Cardiac Diseases

There were 16 cases of chronic endocardial disease and eight with coronary symptoms. The serum bilirubin was found to be increased only in the stage of decompensation, otherwise neither the endocardial lesions nor the coronary disease showed abnormal figures. As previously mentioned, the low figures in angina pectoris help to differentiate this condition from attacks of cholelithiasis when the symptoms are more obscure.

Blood Diseases

In four cases of pernicious anemia, the serum bilirubin was high varying from 2.1 to 3.0 units (10 to 15.5 mgm.). In the secondary anemias, the figures were always low. In fourteen cases of carcinoma of the stomach, the figures were low varying from 0.4 to 0.5 units (2 to 2.5 mgm.). Ten cases of achylia gastrica also showed low figures. Two cases of purpura hemorrhagica and three leukemias were normal.

Negative Results

Thirty-four cases of duodenal ulcers and six gastric ulcers gave normal figures. Only five duodenals showed slight elevation due apparently to the presence of gall bladder adhesions. Thirty-five chronic appendicitis, and six ulcerative colitis showed normal bilirubin figures. Six hypothyroid, four hyperthyroid and two pituitary cases were all normal. Ten cases of pulmonary tuberculosis, five of bronchial asthma, all had normal figures. Fifteen cases of hypertension and nine of nephritis without hypertension were normal. Fourteen cases of diabetes were also normal.

Summary

1) The blood bilirubin estimation gives us most information in the latent state of icterus before evidence of clinical jaundice has appeared. In routine examination of chronic ambulatory patients with symptoms of digestive and nervous disturbances, a group of 28 cases have been found to give evidence of hepatic

derangement as indicated by the high blood bilirubin corresponding to the latent icteric stage. This group represents a definite clinical entity which should be designated as hepatic toxemia.

2) Thirty cases of cephalic and abdominal migraine were found to give high bilirubin readings in the latent stage pointing to hepatic dysfunction as a contributory factor in this disorder.

3) In the large group of cholelithiasis and cholecystitis, the test is only of value during the acute biliary attack when it serves to differentiate it from other forms of abdominal colic, including tabetic crises and angina pectoris.

4) Repeated blood studies in jaundice, noting the course of the bilirubin curve will help differentiate an obstructive from a cararrhal or toxic jaundice.

5) In the treatment with the arsphenamine group, it is important to watch the bilirubin curve in order to avoid arsenical liver toxemia.

6) Cardiac disease gave higher readings only during the stage of decompensation with engorgement of the liver.

7) High blood bilirubin readings are found in pernicious anemia distinguishing it from all forms of secondary anemia. Achylia gastrica, carcinoma of the stomach, the leukemias, purpura hemorrhagica, all give low figures.

8) Peptic ulcer, chronic appendicitis, intestinal stasis, ulcerative colitis, pulmonary tuberculosis, asthma, hypertension, nephritis, and endocrine disease, in the main, give normal readings.

In carcinoma of the liver, higher readings are only obtained when there is a direct interference with the flow of bile by compression of the intermediary or larger ducts.

9) The van den Bergh method has the advantage of being uninfluenced by carotenemia and hemolysis and also differentiates the type of jaundice by its different reactions.

In high bilirubin readings, the modified van den Bergh or the icterus index should be used.

*Section of Obstetrics and Gynecology,
December 27, 1927*

SOME STUDIES IN THE GROSS AND HISTOLOGICAL
ANATOMY OF THE VERUMONTANUM,
EJACULATORY DUCTS AND
SEMINAL VESICLES

J. SIDNEY RITTER

At the suggestion of Doctor Joseph F. McCarthy and under his supervision, plus the kind aid and co-operation of Doctor Paul Kemperer, this investigation was undertaken with an attempt to determine the normal anatomical and histological study of the verumontanum with especial reference to the ejaculatory ducts.

After carefully investigating the literature on this subject due to the divergence of opinions as to the precise course taken of the ejaculatory ducts through the verumontanum and prostate, and due to the fact that the true structure of the verumontanum is somewhat confused, autopsy specimens were obtained with the hope of obtaining a more definite understanding of these parts. All gross anatomical conclusions were made after carefully studying 80 specimens and all histological conclusions were arrived at after studying microscopic sections of 20 specimens, sectioned from above down, side to side and before back so as to see the verumontanum and its glandular structure plus the ejaculatory ducts in their various locations. This necessitated the study of more than 1000 microscopic sections. Our conclusions follow.

The verumontanum is a small elevation in the posterior urethra and is approximately 9 mm. long, 3 mm. wide and extends 3 mm. above the urethral floor (fig. 1). This structure can plainly be seen through any instrument that will permit inspection of the posterior urethra.

The orifices of the utricle and ejaculatory ducts open on the anterior incline of the verumontanum. The utricle, the mid-line. The orifices of the ejaculatory ducts cent. of the specimens examined opened antero-utricular orifice. In 5 per cent. lateral to

in 15 per cent. they opened postero-lateral to this orifice. None was seen to open into the cavity or on the margins of the utricle, or within 1 mm. of this margin. The orifices were open; no valve-like formation or protecting tissue was noted in any of our specimens.

Ejaculatory Ducts

The average length of the ejaculatory ducts is 15 mm., the shortest 9 mm. and the longest 22 mm. In none of our specimens did the ducts extend beyond the prostate gland (fig. 2). The average circumference of the ejaculatory duct at its orifice is 1.9 mm. (fig. 3). As it extends backward through the verumontanum and prostate gland the lumen gradually becomes larger until its division into the duct of the seminal vesicle and ampulla of the vas deferens, at which point the average circumference is 4.5 mm. (fig. 4). At the orifice the lumen is slit-like in shape; as it progresses through the prostate it becomes elliptical, the greater diameter being vertical, and at its termination its lumen is circular (fig. 5).

The course of the ejaculatory ducts is as follows: They take a very sharp dip through the verumontanum from the urethral floor. For the first millimeter and a half the ducts diverge and then converge for the next millimeter or two, until there is a thin septum of fibrous and elastic tissue separating them, which wall is easily penetrated though soft, flexible instruments be used. They then run parallel to each other and usually at a less acute angle through the prostate gland, terminating at the termination of or within the substance of this gland. At their division into the ampulla of the vas deferens and the duct of the seminal vesicles they are furthest away from the urethral floor.

The lumen of the duct of the seminal vesicle is 4.5 mm. whereas the lumen of the ampulla of the vas deferens has a circumference of 3.1 mm.; noting the circumference of the ejaculatory duct at its termination, these measurements may be somewhat confusing. The similarity in size of the lumen of the ejaculatory duct with that of the duct of the seminal vesicle is accounted for by the fact that the ampulla opens on the mesial superior aspect of the ejaculatory duct (fig. 6). Rolnick¹⁹

confirms these findings in his recent article.

This is contrary to Crouse¹⁷ who likens this set of ducts to the biliary passages in which as you all know the common duct is a direct continuation of the hepatic ducts. The cystic duct is a tributary and has numerous valve-like rugae protecting its lumen. Were this analogy correct the duct of the seminal vesicle would be the tributary duct and the ampulla of the vas deferens the direct continuation of the ejaculatory duct. This is contrary to our findings as stated above. Again in our specimens we find that the ampulla of the vas has numerous rugae protecting its lumen and that in each instance when a catheter was introduced by way of the ejaculatory duct orifice it would enter the duct of the seminal vesicle and be arrested by the first sacculation of the vesicle. In none of our specimens were we able to enter the ampulla of the vas deferens by way of the ejaculatory duct. Retrograde catheterization was attempted with similar results, whereas by puncturing the lowermost mesial sacculation of the seminal vesicle we were able to enter the ejaculatory duct in each specimen.

Prior to disturbing the specimens solutions were injected through the vas; our results coincide with Belfield's opinion and Lespenasse's¹⁸ findings on cadavaric specimens, in that the seminal vesicle was distended prior to the appearance of any of the solution at the orifice of the ejaculatory duct (fig. 7). However, our findings disagree with Belfield in that since the specimens were postmortal, this phenomena could not be explained by sphincteric action. The average capacity of the seminal vesicles was found to be 3.6 c. c., the greatest 7 c. c. and the smallest 2 c. c. (fig. 8).

In numerous specimens the ejaculatory ducts were catheterized and fluid injected. Here too the seminal vesicles were distended prior to the solution entering the ampulla of the vas deferens (fig. 9). This is contrary to Young who, in describing an x-ray plate in which the vas had been injected, states that probably owing to the fact that a long cannula, which entered the vas deferens on each side, was used, the vesicles were not injected; to inject the vesicles the cannula is introduced a shorter distance. This would lead one to believe that the ampulla of the vas is a direct continuation of the ejaculatory

ducts. This is contrary to our findings (fig. 10). Embryologically the seminal vesicles are a side pouching of the Wolffian duct. In the adult male, however, the anatomical study definitely shows the vas opening into the duct of the seminal vesicles at a 30 degree or greater angle to form the ejaculatory duct and that this formation takes place within the prostate gland.

Therefore in order to catheterize the ejaculatory duct it is necessary to engage the tip of the catheter in the orifice and then deflect the catheter to an angle of approximately 45 degrees. The lateral curvature of the ejaculatory duct for its first 3 mm., as described above, may necessitate a slight sideways tilting of the instrument to avoid penetrating the septum between the ducts.

Histological Conclusions

The verumontanum has a thin layer of smooth muscle supporting its epithelium which is a direct extension of the urethral epithelium. This layer of smooth muscle extends anteriorly, posteriorly and laterally to merge with the smooth muscle of the urethra. The verumontanum has a supporting structure of fibrous tissue intermingled with smooth muscle which is similar to that of the prostate gland (fig. 11). It contains a moderate amount of elastic tissue which surrounds the various ducts and tubules of this structure, gradually fading into the interstitial tissue surrounding the acini of the prostate gland (fig. 12).

The utricle occupies the central portion of the verumontanum and varies in size and shape, usually appearing in the form of a sacculation or a large duct running parallel with the urethral floor (figs. 13 and 14). It is approximately 6 mm. long (fig. 15). There are prostatic tubules seen opening into the floor and distal extremity of this cavity. Corpora amalycea were seen within these tubules and also within the lumen of the utricle (fig. 16).

There are numerous tubules and prostatic ducts surrounding the utricle. The ejaculatory ducts at their beginning are closely associated with this structure. No definite layer of muscle can be seen surrounding the utricle. Wavy strands of elastic tissue are seen in close approximation to it.

The ejaculatory duct opens as stated in the majority of cases antero-lateral to the orifice; no muscle was seen nor protecting tissue at the orifice so that we may definitely state that the ejaculatory duct orifice is not protected by either flap of tissue or sphincter. In their passage through the verumontanum and prostate occasionally prostatic ducts were seen opening into them (fig. 17).

No definite layer of muscle tissue either circular or longitudinal could be demonstrated associated with these ducts (fig. 18); however, a fair amount of elastic tissue was seen surrounding them, up to their termination where on the lateral wall of the duct of the seminal vesicle this elastic tissue continued. On the mesial aspect where the ampulla of the vas joins this duct the elastic tissue was absent and replaced by definite muscle tissue (figs. 19, 20 and 21). Surrounding the ejaculatory duct, a distinct group of venous sinuses was noted which if you could stretch your imagination would lead one to believe that the ejaculatory duct had a corpus cavernosus of its own (fig. 22).

There is a large artery situated between the ducts and posterior to them. It is somewhat larger than one would expect and probably sends off branches to the prostate and urethra. There was a normal amount of nerve tissue present the distribution being similar to that found in other tissues of the body.

The epithelial lining of the ejaculatory duct is of a transitional type gradually becoming columnar as it reaches the prostate gland. There are brown pigment granules within the columnar cells of specimens obtained from subjects of the second decade or later.

In conclusion we feel that an explanation of the physiological fact that the seminal vesicles are distended when solutions are injected either through the vas deferens or ejaculatory duct is of utmost interest and importance.

1—The seminal vesicles are distended when fluids are injected through the vas deferens because:

a—The normal resistance of the walls of the ejaculatory ducts the lumina of which become gradually smaller as they approach the urethral floor, causes the liquids to flow toward the seminal vesicles.

b—A large muscular organ (the prostate) surrounds the ejaculatory ducts and offers resistance to their distention.

c—The ejaculatory duct has no musculature of its own to overcome the resistance of the prostate musculature.

d—The fact that the lateral wall of the duct of the seminal vesicle contains elastic tissue which is less resistant to distention than muscle tissue.

2—The seminal vesicles are distended when solutions are injected by way of the ejaculatory duct prior to any solution appearing in the vas deferens because:

a—The duct of the seminal vesicle is a direct continuation of the ejaculatory duct.

b—The lateral wall of the duct of the seminal vesicle contains elastic tissue and is therefore less resistant and more readily distended than the ampulla of the vas deferens.

c—The lumen of the ampulla of the vas is surrounded by thick muscle walls and its orifice opens superomesially into the ejaculatory duct.

d—The lumen of the ampulla contains several valve-like protecting folds within its lumen which tend to obstruct the entrance of any fluid into the vas deferens.

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BIOCHEMICAL STUDIES OF THE PROSTATO-SEMINAL SECRETIONS

JOHN A. KILLIAN, Ph.D.

C. TRAVERS STEPITA

Three years ago, the work of endeavoring to devise a feasible method for the instrumentation of the ejaculatory ducts and seminal vesicles was undertaken, with a view to a rational therapy, and for diagnostic purposes, at which time considerable mechanical difficulties were encountered.

A more detailed knowledge of the anatomical relations of the ejaculatory ducts to adjacent structure was required to obviate these difficulties. The lack of such knowledge stimulated the intensive histo-anatomical study of the ejaculatory ducts and seminal vesicle by McCarthy, Ritter and Klemperer.

It was then that the ultimate bio-chemical studies of the prostatic-vesicular sections were undertaken to the end that before inaugurating rational therapy of these structures, we would have basic scientific standards, as a point of departure. There also arose the necessity of determining the composition of the normal prostatic-vesicular secretions as a standard with which the chemical change in pathological fluids might be compared.

A review of the literature revealed scattered and, at times contradictory, data, but no comprehensive bio-chemical studies of these fluids. To obtain information of practical value concerning the principal components of the prostatic-vesicular secretions, fairly complete analyses have been made of the secretions obtained from normal men.

The object of this communication is to present the results of our studies in a preliminary form.

The procedure adopted in obtaining the prostatic secretions was as follows:

After the bladder had been completely emptied, the anterior urethra was irrigated with warm boric acid solution. A No. 14 F. soft rubber catheter was passed under aseptic conditions and six ounces of warm boric acid solution were retrojected. After withdrawal of the catheter, the subject was massaged by the right index finger of the operator, beginning with the vesicles and finishing with the prostate. During the massage, the secretion was collected in a dry sterile test tube. Specimens from several individuals were combined to afford enough material for the analysis.

The results of these bio-chemical studies are, we believe, of great interest. The total solids varied from 4.8 to 9.9 per cent., with an average of 8.0 per cent.; these secretions contain an unusually high concentration of calcium; the phosphorus is markedly increased over that of the blood serum. Randall and Muschat have reported an average pH of 7.24 for normal prostatic secretion. According to this finding, the prostatic secretion is less alkaline than blood plasma. It is difficult to understand how these secretions with that degree of alkalinity can carry in solution much greater quantities of calcium and phosphate than the blood serum. It appears possible that the very efficient buffering mechanism of the semen may depend upon the high content of calcium and phosphates.

The non-protein nitrogen of these secretions averaged 174 mgm. per 100 c. c.

Variations in urea nitrogen were from 29 to 130 mgm. per 100 c. c.

The amino-nitrogen was in unusually high concentration, about three times the upper normal level of fasting blood. It is believed that the amino-nitrogen and hydrolipale phosphorus may be in the form of spermine.

The relatively high figures for creatinine are of interest, the concentration being about twice that of whole blood.

These secretions also show the presence of a glycogen splitting enzyme, a diastase. The diastatic activity is very similar to that of blood.

In fresh specimens of semen obtained from 50 human subjects the sugar concentration varied from 67 to 658 mgm. per 1 c. c. In 80 per cent. of the specimens the sugar content exceeded 300 mgm. per 100 c. c. The Shaffer-Hartmann method was utilized in these analyses. Fresh specimens of semen collected and maintained under aseptic conditions and containing motile spermatozoa showed a decrease in sugar when incubated at 38 degrees C. for 6, 9, 12 and 24 hours. The final concentration of sugar after 24 hours incubation amounted to from 10 to 25 per cent. of the original concentration. No glycolysis was noted in specimens placed under water bath at 100 degrees C. for five minutes before incubation. The lactic acid of fresh semen varied from 95 to 137 mgm. per 100 c. c., determined by the Brehme and Brahdy modification of the Clausen method. During incubation, an increase in lactic acid was noted coincident with the fall in sugar. Lactic acid, however, is not the end product of glycolysis, since in some specimens, the initial increase in lactic acid was followed by a subsequent fall. With Cullen's method the average pH of fresh semen was found to be 7.6. During the first 6 hours of glycolysis the pH rose to 8.0 and subsequently it fell to an acid reaction.

PROCEEDINGS OF ACADEMY MEETINGS,
DECEMBER

STATED MEETINGS

Thursday Evening, December 1, at 8:30 o'clock

ORDER

- I. EXECUTIVE SESSION
Election of Officers
 - II. SYMPOSIUM: MALARIA IN SYPHILIS
 - a. The malaria treatment of general paresis (observations based on four and one-half years' experience).
George H. Kirby, Director, Psychiatric Institute,
Henry A. Bunker, Assistant Director, Psychiatric
Institute (by invitation).
 - b. Clinical results following malarial therapy in paresis.
Charles W. Stone, Associate Professor of Nervous
Diseases, Western Reserve University, Cleveland (by
invitation).
 - c. Experiences with malarial inoculation in syphilis.
Jay F. Schamberg, Professor of Dermatology and
Syphilology, Graduate School of Medicine, University
of Pennsylvania, Philadelphia (by invitation).
- Thursday Evening, December 15, at 8:30 o'clock

ORDER

- I. EXECUTIVE SESSION
- II. PAPERS OF THE EVENING
 - a. Experimental investigation of the tumor question.
James B. Murphy, Rockefeller Institute for Medical
Research.
 - b. The treatment of lobar pneumonia with refined sera.
(From the Littauer Pneumonia Fund, New York Uni-
versity; Harlem Hospital; Research Laboratory,
Department of Health).
 - 1. The control. Jesse G. M. Bullowa.
 - 2. Bacteremia in relation to prognosis and treatment.
Milton B. Rosenblüth.

3. Dosage. William H. Park, Miss Georgia Cooper (by invitation).

Discussion. Samuel A. Brown, Emanuel Libman, William R. Williams.

SECTION MEETINGS

SECTION OF SURGERY

Friday Evening, December 2, at 8:30 o'clock

- I. READING OF THE MINUTES
- II. PRESENTATION OF CASES
 - a. 1. Gangrenous intussusception with resection of four inches of ileum in a child four months of age.
 - 2. Chronic intussusception. Reduction.
 - 3. Transperitoneal nephrectomy in a child of four years with congenital heart.
 - 4. Suppurative arthritis of the shoulder in infancy; 2 cases, Edward J. Donovan.
 - b. Obscure cholelithiasis: Roentgenogram after injection of the sinus, gall-bladder and gall-ducts with sodium iodid, Victor C. Pedersen.
 - c. 1. Gastric ulcer, contact duodenal ulcer; excision of gastric ulcer, cautery puncture duodenal ulcer, posterior gastro-enterostomy. Cured 21½ years.
 - 2. Gastric ulcer excision gastro-enterostomy. Cured 6 years.
 - 3. Aberrant pancreatic tissue simulating duodenal ulcer.
 - 4. Two cases of intussusception in infants showing pre-operative knee-elbow posture, Henry W. Cave.

III. PAPER OF THE EVENING

The results of resection for gastric and duodenal ulcer, A. A. Berg.

IV. DISCUSSION OF THE PAPER

George Woolsey, John A. Douglas, Fordyce B. St. John.

SECTION OF DERMATOLOGY AND SYPHILIS

Tuesday Evening, December 6, at 8:00 o'clock

ORDER

I. PRESENTATION OF PATIENTS

- a. Cases from the New York University and Bellevue, Howard Fox, E. R. Maloney, W. J. Highman, C. J. Halperin, P. E. Bechet, Rudolph Boenke, Leo Spiegel, F. C. Combes, H. C. Saunders, Herman Sharlit, J. P. Thornley, Louis Tulipan, David Bloom, E. F. Traub.
- b. Miscellaneous cases.
- c. Demonstration of cistern puncture (cisterna magna), Leo Spiegel.

II. DISCUSSION

III. EXECUTIVE SESSION

NOTE: Examination of cases is limited to members and their invited guests.

SECTION OF PEDIATRICS

Thursday Evening, December 8, at 8:30 o'clock

ORDER

I. READING OF THE MINUTES

II. PAPERS OF THE EVENING

- a. Auricular fibrillation in children; its relationship to rheumatic heart disease, Sidney P. Schwartz (by invitation); Morris M. Weiss (by invitation).
Discussed by Cary Eggleston.
- b. Urobilinuria in children with heart disease (preliminary report).
Discussed by M. H. Edelman, John H. Killian, Ph.D. (by invitation); Walden E. Muns (by invitation); Roger H. Dennett.

SECTION OF OTOTOLOGY

Friday Evening, December 9, at 8:30 o'clock

ORDER

I. READING OF THE MINUTES

II. PRESENTATION OF CASES

- a. Lateral sinus thrombosis and cavernous sinus thrombosis complicating a radical mastoid operation.
- b. Suppurative labyrinthitis and meningitis complicating simple mastoid operation, H. Clifton Luke.

III. PAPER OF THE EVENING

Some mooted questions in sound conduction and perception, Francis P. Emerson, Boston (by invitation).

- IV. DISCUSSION BY
Edmund Prince Fowler (by invitation) ; R. L. Wegel, Bell
Telephone Laboratories (by invitation).

V. EXECUTIVE SESSION

SECTION OF NEUROLOGY AND PSYCHIATRY
Tuesday Evening, December 13, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. CASE PRESENTATION
- a. A case of vegetative irritability and its response to treatment.
 - b. A case of chronic sphenoiditis producing focal epilepsy, George H. Hyslop.
- III. PAPERS OF THE EVENING
- a. An analysis of 331 cases of head injury in children with especial reference to end results, Fenwick Beekman.
Discussion, Carl G. Burdick, M. Osnato, Thomas K. Davis.
 - b. Pathological conditions complicating fractures of the skull, Benjamin M. Vance (by invitation).
Discussion, Charles Norris, John A. McCreery, E. D. Friedman.
- IV. EXECUTIVE SESSION

SECTION OF ORTHOPEDIC SURGERY
Friday Evening, December 16, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. PRESENTATION OF CASES
- a. Giant cell sarcoma of the tibia.
 - b. Case of dyschondroplasia, Mather Cleveland.
 - c. Fracture of the carpal scaphoid.
 - d. Fracture of the carpal scaphoid complicated by dislocation of the semilunar, Paul C. Colonna.
 - e. Cases illustrating the first paper of the evening, Irvin Balensweig.
 - f. Cases illustrating the second paper of the evening, Joseph Buchman (by invitation).

III. PAPERS OF THE EVENING

- a. Injuries of the carpal bones, Irvin Balensweig.
- b. Traumatic osteoporosis of the carpal bones, Joseph Buchman (by invitation).

IV. DISCUSSION OPENED BY

Edward R. Easton.

SECTION OF HISTORICAL AND CULTURAL MEDICINE

Friday Evening, December 16, at 8:30 o'clock

ORDER

I. PAPERS OF THE EVENING

- a. Napoleon. His last illness and postmortem examination. Exhibition of books, autograph letters, medals, etc., relating to St. Helena, Paul E. Bechet.
- b. The influence of habit in the evolution of man and of the great apes. Lantern slides, Henry Fairfield Osborn, American Museum of Natural History (by invitation).

II. DISCUSSION

Raymond L. Ditmars, Zoological Park (by invitation); W. Reid Blair, Zoological Park (by invitation); Frederick Tilney, William K. Gregory, American Museum of Natural History (by invitation); Dudley J. Morton, Yale University. (by invitation).

SECTION OF OPHTHALMOLOGY

Monday Evening, December 19, at 8:30 o'clock

ORDER

I. READING OF THE MINUTES

II. PRESENTATION OF CASES

- a. Report of a case of sarcoma of the ciliary body, with specimens and subsequent history, Arnold Knapp.
- b. Optic nerve tumor, report of a case, Herbert W. Wootton.
- c. A case of chloroma with ocular lesions, Martin Cohen.
- d. Blue sclerotics-fragilitas syndrome—report of occurrence in mother and infant, Samuel P. Oast (by invitation).

- e. Recurrent vitreous hemorrhage and its relation to calcium content of the blood—report of a case and presentation of a patient, Thomas H. Curtin.
- f. A case of detachment of the retina, with extensive tear exposing a large area of naked choroid, Henry Minsky (by invitation).
- g. Demonstration of an attachment to the slit-lamp to produce optical sections in the eye media, Mark J. Schoenberg.

III. PAPER OF THE EVENING

Experiences with ephedrin, Mark J. Schoenberg.

IV. EXECUTIVE SESSION

SECTION OF MEDICINE

Tuesday Evening, December 20, at 8:30 o'clock

ORDER

I. PAPERS OF THE EVENING

- a. Studies in blood bilirubin and its value as a routine measure with a report of 500 cases, Joseph S. Diamond.
- b. Importance of conservative treatment in chronic ulcerative colitis, Burrill B. Crohn.
- c. Some observations on chronic ulcerative colitis, Jerome M. Lynch (by invitation).

II. DISCUSSION

Howard F. Shattuck, John C. Torrey (by invitation);
Douglas Palmer (by invitation).

SECTION OF GENITO-URINARY SURGERY

Wednesday Evening, December 21, at 8:30 o'clock

ORDER

I. PRESENTATION OF CASES

From the service of Mount Sinai Hospital

- 1. Uremia due to ureteral obstruction—nephrotomy, Paul W. Aschner.
- 2. Ectopic supernumerary ureter opening in vagina, partial resection of kidney and ureter, Abraham Hyman.
- 3. Bilateral double pelves and double ureters, right nephrectomy and left heminephrectomy, Abraham Hyman.

4. Solitary kidney with artificial ureter, Abraham Hyman.
5. Stone in hypoplastic misplaced kidney, Edwin Beer.
6. Infected left calculous hydronephrosis in right iliac fossa, Edwin Beer.
7. Papillary carcinoma of bladder—resection (2 cases) cured seven and five years, Paul W. Aschner.
8. Carcinoma of bladder—secondary to artificial cystitis calculous pyelonephrosis; Nephrectomy; Total cystectomy and partial ureterectomy, and partial prostatectomy, Edwin Beer.
9. Breast development after prostatectomy, Lewis T. Mann.
10. X-ray signs of perinephritic abscess, Edwin Beer.
11. Pyelogram of kidney following pressure of perinephritic abscess, Abraham Hyman.
12. The nitrite reaction as an indicator of urinary infection, Lewis T. Mann, Abraham Hyman.
13. Effect of nephrotomy—incision and suture—on renal function, Edwin Beer.
14. Variation and peculiarities in x-ray shadows, Edwin Beer.
15. Massive hematuria complicating pyelonephritis, Abraham Hyman.
16. Frequency of reflux in cystography, Paul W. Aschner.
17. Bilateral renal calculi—solitary large stone in one side and 200 to 300 facettted stones in other kidney. Bilateral pyelolithotomy under spinal anesthesia. Points in technique of operative removal of kidney stones, Edwin Beer.

SECTION OF OBSTETRICS AND GYNECOLOGY
Tuesday Evening, December 27, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. PAPERS OF THE EVENING
 - A symposium on sterility.
 - a. Factors in female sterility, Isidor C. Rubin.
Discussion by Robert L. Dickinson.

- b. Instrumentation of ejaculatory ducts and seminal vesicles, Joseph F. McCarthy.
- c. Some studies in the growths and histological anatomy of the verumontanum, ejaculatory ducts and seminal vesicles, J. Sydney Ritter.
- d. Bio-chemical studies of the prostato-seminal secretions, John A. Killian, Ph.D. (by invitation), Cornelius T. Stepita.
Discussion by Clarence G. Bandler, Stanley R. Woodruff.

III. GENERAL DISCUSSION

IV. EXECUTIVE SESSION

SECTION OF LARYNGOLOGY AND RHINOLOGY
Wednesday Evening, December 28, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. PRESENTATION OF CASES
 - a. Suction apparatus with specimen collector.
 - b. A case of dysphonia stastica, Leopold I. Glushak.
Report of a case of pericardo-esophageal fistula following foreign body, Charles J. Imperatori.
- III. PAPERS OF THE EVENING
 - a. Vincent's infection of the mouth, Raymonde H. Albray, D.D.S. (by invitation).
 - b. Bacteriology of Vincent's infection of the nose and throat, J. Creighton Barker.
 - c. Systemic manifestations of Vincent's infection, Charles Frederick Tenney.
Discussion opened by James G. Dwyer.

BOOK REVIEW

A TEXT-BOOK OF MEDICINE

By American Authors
 Edited by RUSSELL L. CECIL
 Associate Editor, FOSTER KENNEDY

One approaches the review of a textbook on medicine with the greatest temerity. The size alone of such a work makes it difficult to know it well enough to criticize it; one's judgment must usually, as in the present case, be made by judicious sampling.

The plan of the editors was that the book should be written by American authors, each an authority in the field he was to cover. They had then before them the following problem: the division of subjects into proper groups, the obtaining of competent men to do the work, and the editing of the articles, as presented, so that the book should have a uniformity of context and proper emphasis, and should emerge as a textbook rather than as a series of unrelated articles.

The division into subjects and their arrangement is for the most part excellent. Repetition has usually been avoided. The topics are first considered under the head of etiology and then later in structural groups. It is interesting to compare the various etiologies in the table of contents with the table of contents of Austin Flint's textbook of sixty-odd years ago and note the tremendous advance in our knowledge of the causes of disease. This double classification makes it difficult to avoid repetition and to secure proper emphasis. One feared that when the article on etiology was written by one person and that on structure by another, there might be serious interferences. The editors have, however, handled this problem successfully.

A few symptoms still crawl into the text as major headings. No doubt the time will come when it will be no more necessary in a general textbook to have a separate article on jaundice, or asthma, or angina pectoris, than it is now to have articles on fever or cough or diarrhœa.

In the choice of contributors the editors have been singularly fortunate. Although authors have been drawn from the departments of medicine of nearly every medical school in the United States and Canada, in nearly every case, the authority rather

than a popular writer has been chosen. One does wonder why Homer Smith did not write the article on Trench Fever when he was the obvious choice, and why such an important consideration as Symptomatic Disorders of the Heart should have been assigned to just the physician it was. But these are minor slips, and the article on Trench Fever is excellent.

In general the articles are clearly written, are just in their proportion, and are up-to-date. Naturally there is a certain unevenness as to quality, certain sections, as well as certain articles, being much stronger than others. I think the section on Infectious Diseases is particularly good.

Since Sir William Osler's death, many have felt that some sections of his book were not being kept as modern as a students' textbook should be. I believe that for new facts this new book is better. No book written by one hundred and twenty authors could be a literary masterpiece, nor could this book be expected to have the charm of Osler's style. It will probably never stimulate anyone's imagination to the point of establishing great institutes for the study of disease. Nevertheless I believe that Dr. Cecil and Dr. Kennedy have made a real contribution to medical education; the book will be of great value to the undergraduate medical student, who is getting his bird's eye view, and to the average busy general practitioner, who should, of course, go to the original sources for himself, but who, being an average man, so seldom does.

JOHN WYCKOFF.

REPORT ON THE OFFICE OF THE CHIEF MEDICAL
EXAMINER OF THE CITY OF NEW YORK
BY COMMITTEE ON PUBLIC HEALTH
RELATIONS

The Chief Medical Examiner of this city began his work on January 1, 1918. By a legislative act, the coroners, who were county officers, were abolished and their work in all of the counties of New York City was turned over to the Chief Medical Examiner.

The office was created, first, to do away with certain inherent deficiencies that existed in the coroner system, and, secondly, to organize a forensic medicine department of the city on a modern scientific basis. It is not generally realized that from 15 to 20 per cent of all deaths occurring in the Greater City come within the jurisdiction of the Chief Medical Examiner. In the year 1926, there were in New York City 76,182 deaths, and of these 13,610 were Medical Examiner's cases. About two thousand autopsies were performed in the Manhattan Mortuary alone.

In spite of the handicaps of insufficient equipment and paucity of personnel, the work of the Chief Medical Examiner, under the direction of Dr. Charles Norris, has fully justified the hopes of those who helped to secure the legislation abolishing the coroner system.

At the close of the ten years of existence of the office, it is desirable to emphasize the needs of the Department, in order to make possible an even greater efficiency of this important public office. The primary need is provision for an adequate chemical laboratory staff. Immediate toxicological examinations are necessary not only in many cases of homicide, but in case of deaths from accidents as well as sudden deaths. At the present time, by courtesy of the Board of Trustees of Bellevue Hospital, the Chief Medical Examiner's office is using the chemical laboratory at that hospital, and the work is in charge of a competent pathological chemist, whose salary is paid by Bellevue Hospital, and who gives but part-time service to the Chief Medical Examiner. There is need of a full-time assistant pathological chemist, first because of the amount of work to be per-

formed and secondly because of the practical experience necessary to carry out satisfactorily the exacting routine.

There is need of a morgue in every borough of the city. At the present time there are only three municipal morgues—one in Manhattan at Bellevue Hospital, one in Brooklyn at Kings County Hospital and one in the Bronx at Fordham Hospital.

The Department should be provided with cars, in view of the many calls upon the medical examiners and the long distances they must often travel, particularly in the outlying boroughs.

The salaries of the medical staff need readjustments, in view of the important and responsible duties devolving upon them, and, in view of the fact that the ordinary civil service hours do not apply to them, as they are on call at all times. The present medical personnel consists of:

The Chief Medical Examiner who receives a salary of \$7,500 per annum; two Deputy Chief Medical Examiners, each receiving \$4,500 per annum; 14 Assistant Medical Examiners, each receiving \$4,100 per annum. Of the laboratory staff only three are on the payroll of the Chief Medical Examiner's office, viz., one laboratory assistant at \$1,288 per annum, another at \$980 and a laboratory helper at \$920.

The entire budget of the Chief Medical Examiner, including clerical help, telephone service and supplies, amounts annually to \$155,001 or a little over \$11 per case. In spite of the growth of the population during the decade of its existence, the high calibre of the work performed, and the decline in the purchasing power of the dollar, the cost of the office in 1927 has been less than during the last year under the coroners' system.

The high personal and professional character of Dr. Charles Norris, the incumbent of the office of the Chief Medical Examiner since its establishment, and his fine sense of civic duty are responsible for the honest and efficient services rendered to the community.

LIBRARY NOTES

DAMAGE TO BOOKS

Mutilating or defacing of books at the Academy, which formerly was of frequent occurrence, seems to have lessened with our change of base. Whether this be true or only apparent cannot be said with positiveness. If true, it may be due to the fact that readers of a certain class have not been visiting the library since the move to 103rd Street. A number of "floaters," people who used our library as a club, were in evidence at 43rd Street. These came in the morning and read (and occasionally slept), till leaving time at two o'clock. Some of these were suspected of being the mutilators of books and journals, but owing to lack of supervision, proof was lacking. On the other hand, it is possible that this form of abuse of library property may be committed like book larceny by anyone. Mr. E. W. Gaillard, of the New York Public Library, who has a long experience with the stealing of books concludes that there is no particular class of *book thieves*; that the book and the opportunity and the desire occur simultaneously and the theft follows; anyone may succumb.

Mutilations are of several kinds, the cutting of pages from an article, or the removal of a picture, or underscoring of passages with pen or pencil. The first is usually of scientific or news value, while this second loss is usually of the pornographic; as partial preventive of the latter, a number of books have been put in locked cases. But these are of course but a fraction of the books subject to the vandal.

During the year 1927 it has come to the attention of members of the library staff on half a dozen occasions that one or several pages have been removed from current magazines or from the bound volumes of recent years. The vandals, of course, do their mischief when no one is about.

In the New York Public Library recently a man was detected cutting articles out of bound volumes of newspapers. He was arrested and sentenced to the workhouse for four months. The law is plain and copies of it are displayed in every public

library, so that a plea of ignorance of the law is no excuse. Besides, everyone must know that to destroy or steal property in this way is a wrong thing to do.

RECENT ACCESSIONS TO THE LIBRARY

de Almeida, A., Jr. O exame medico pre-nupcial.

S. Paulo, Inst. d. Anna Rosa, 1927, 110 p.

American child health association. Health trends in secondary education.

N. Y., Am. child health association, 1927, 153 p.

American pharmaceutical association. The national formulary, 5. ed. Phila., Am. phar. asso, 1926, 546 p.

Bailey, H. Demonstrations of physical signs in clinical surgery. Bristol, Wright, 1927, 217 p.

Burke, E. T. Treatment of venereal disease in general practice. N. Y., Oxford pr., 1927, 162 p.

Bush, A. D. A textbook of pharmacology. Phila., Blakiston, 1927, 181 p.

Calligaris, G. Il sistema motorio extrapiromidale. Milano, Soc. an. istituto ed. sci., 1927, 1256 p.

Cavaillon. L'armement anti-vénérien en France. Paris, Le mouv. sanit., 1927, 473 p.

Cimbal, W. Die Neurosen des Kindesalters. Berlin, Urban, 1927, 509 p.

Chesterton, G. K. Eugenics and other evils. N. Y., Dodd, 1927, 246 p.

Coope, R. The diagnosis of pancreatic disease. Lond., Oxford pr., 1927, 112 p.

Corscaden, J. A. History taking and recording. N. Y., Hoeber, 1926, 78 p.

Crow, D. A. The ear, nose, and throat in general practice. N. Y., Oxford pr., 1927, 150 p.

Cullen, T. S. Early medicine in Maryland. Balt., 1927, 15 p.

Domitilla, M. Outline of materia medica and special therapeutics. Phila., Saunders, 1927, 101 p.

- Enghoff, H. Der Barospirator.
Berlin, 1927, De Gruylter, 168 p.
- Fattori di guarigione spontannca delle malattie infettive. Ciclo di lezioni organizzato dall'Istituto sieroterapico Milanese.
Milano, Istitu. siero., 1927, 369 p.
- Fitzwilliams, D. C. L. The tongue and its diseases.
Lond., Oxford pr., 1927, 506 p.
- Forgue, E. Au seuil de la chirurgie.
Paris, Doin, 1927, 226 p.
- Haber, F. Aus Leben und Beruf. Aufsätze: Reden: Vorträge.
Berlin, Springer, 1927, 173 p.
- Harrow, B. Eminent chemist of our time. 2. ed.
N. Y., Van Nostrand, 1927, 471 p.
- Hehir, Sir Patrick. Malaria in India.
Lond., Oxford pr., 1927, 490 p.
- Heller, J. Arzt und Eherecht.
Berlin, Marcus, 1927, 140 p.
- Hertzler, A. E. & Chesky, V. E. Minor surgery.
St. Louis, Mosby, 1927, 568 p.
- Hess, J. H. Feeding and the nutritional disorders and infancy and childhood, 5. ed.
Phila., Davis, 1927, 56 p.
- Heubner, W. Otto Heubners Lebenschronik.
Berlin, Springer, 1927, 228 p.
- Holweck, F. De la lumière aux rayons X.
Paris, Pr. univ. d. France, 1927, 142 p.
- Kiefer, E. Befestigungs—und Entlastungsschienen.
Berlin, Meusser, 1927, 54 p.
- Kohnstamm, O. Erscheinungsformen der Seele.
München, Reinhardt, 1927, 575 p.
- Kretschmer, E. Ueber Hysterie. 2. Aufl.
Leip., Thieme, 1927, 128 p.
- Lamy, Maurice. La réaction de Dick et l'immunité vis-à-vis de la scarlatine.
Paris, Legrand, 1927, 158 p.
- Lectures on the biologie aspects of colloid and physiologic chemistry . . . 1925-26.
Phila., Saunders, 1927, 244 p.

- Leys, D. Chronic pulmonary catarrh.
Lond., Lewis, 1927, 130 p.
- Lipschitz, M. Die Selbstregulierung des Gebisses.
Berlin, Meusser, 1927, 147 p.
- Lockhart, L. P. A short manual of industrial hygiene.
Lond., Murray, 1927, 114 p.
- Macalpine, J. B. Cystoscopy.
N. Y., Wood, 1927, 284 p.
- McAuliffe, G. B. The essentials of otology.
N. Y., Oxford pr., 1927, 177 p.
- Maclean, H. Modern methods in the diagnosis and treatment of renal disease. 3. ed.
Lond., Constable, 1927, 135 p.
- Maurice-Lévy, Les ramollissements sylvien.
Paris, Doin, 1927, 21 p.
- Maygrier, C. & Schwaab, A. Précis d'obstétrique. 3. éd.
Paris, Doin, 1927, 1238 p.
- Mind (The). By various authors. Ed. by R. J. S. McDowall.
Lond., Longmans, 1927, 315 p.
- Mumford, A. A. Healthy growth.
Lond., Oxford pr., 1927, 348 p.
- National league of nursing education. A curriculum for schools of nursing. 6 ed.
N. Y., Nat. league nurs. ed., 1927, 227 p.
- Newsome, E. Every woman a nurse.
Lond., Oxford pr., 1927, 204 p.
- Noyes, A. P. A textbook of psychiatry, for . . . schools of nursing.
N. Y., Macmillan, 1927, 333 p.
- Noyons, A. K. The differential calorimeter.
Louvain, Fonteyn, 1927, 189 p.
- Parsons, Sir John H. An introduction to the theory of perception.
Cambridge, Univ. pr., 1927, 254 p.
- Pavlov, I. P. Conditioned reflexes.
Oxford, Univ. pr., 1927, 430 p.
- Peabody, F. W. The care of the patient.
Cambridge, Harvard . . . pr., 1927, 48 p.

- Raylings, I. D. [et al.] The rise and fall of disease in Illinois.
Springfield, State dept. of health, 1927, 432 p.
- Ricker, G. Sklerose und Hypertonie der innervierten Arterien.
Berlin, Springer, 1927, 193 p.
- Sanger, M. What every boy and girl should know.
N. Y., Brentano, 1927, 140 p.
- Society (The) of the New York Hospital. School of nursing...
Fiftieth anniversary 1877-1927.
- Stone, W. J. Blood chemistry, colorimetric methods for the
general practitioner, 2. ed.
N. Y., Hoeber, 1926, 129 p.
- Studien zur Geschichte der Chemie. Festgabe Edmund O. v.
Lippmann zum siebzigsten Geburtstage.
Berlin, Springer, 1927, 242 p.
- Thouless, R. H. The invert.
Lond., Baillière, 1927, 159 p.
- Wallin, J. E. W. Clinical and abnormal psychology.
Bost., Houghton, 1927, 649 p.
- Wassmund, M. Frakturen und Luxationen des Gesichtsschädels.
Berlin, Meusser, 1927, 384 p.
- White, C. P. The principles of pathology.
N. Y., Longmans, 1927, 279 p.
- Wilson, F. P. The plague in Shakespeare's London.
Oxford, Clarendon pr., 1927, 228 p.

EXHIBIT

An exhibition of books, portraits and records, illustrating the progress of dentistry, has been arranged for the month of February; this month being the hundredth anniversary of the publication of the first important book, "Le Chirurgien Dentiste," by Pierre Fauchard, the "Father of Dentistry."

ACTION OF THE TRUSTEES IN REGARD TO A BEQUEST

By the will of the late Lewis Duncan Mason, a Trust was created in favor of The New York Academy of Medicine as follows:

Unto the New York Academy of Medicine, now located at No. 21 West Forty-third Street, Borough of Manhattan, New York City, Five Thousand Dollars, the net income thereof to be applied towards the expense of an annual address to be delivered before the Academy and published, on some subject in relation to alcohol and other narcotics, the special topic to be selected annually by the American Medical Society for the Study of Alcohol and Narcotics, T. D. Crothers, M.D., Secretary, Hartford, Conn., and that said fund shall be called "The Theodore L. Mason Memorial Fund."

Resolution of the Board of Trustees:

RESOLVED, that the Trustees of the Academy appreciate the generous intent of the late Lewis Duncan Mason and believe it unwise for The New York Academy of Medicine to accept this bequest, because they feel that all lectures and addresses should be under the control of the Academy.

IMPRESSIONS OF MEDICAL TEACHING AND HOSPITAL WORK

In a long article published in three of the summer numbers of the *Münchener Medizinische Wochenschrift*, Professor Friedrich Müller of the First Medical Clinic of the University of Munich describes his impressions of his visit to the United States in 1927. Professor Müller had visited the United States twenty years before and he comments with great interest on changes which have taken place during the last twenty years.

His comments cover a wide range of matter from medical education, pre-medical education, hospital construction and administration, teaching in medical schools and medical research. His remarks are quite dogmatic, free from bias, devoid of criticism and without praise. They seem to be the expression

of a cool, impartial judgment on medical schools and hospitals as a German professor of medicine sees it. Naturally, he compares some of the differences which exist in medical work in the United States and Germany, and one has the impression that he prefers some parts of the German system to that which exists in this country. One rather feels a bit of jealousy of the economic development of this country which has made possible enormous contributions for the development of medical schools, hospitals and research.

Medical Education

The old proprietary medical schools have disappeared and enormous sums of money have been given for the development of hospitals under the control of medical schools. In many of these medical schools recently developed, there are not only medical and surgical clinics but also departments for physio-chemistry, pharmacology, bacteriology and pathology. These departments are richly furnished with all the existing facilities for chemical and physio-chemical experiments, respiratory apparatus, electro cardiograph, and all other necessary instruments. In many of the clinics, the impression is given that they are primarily created for experimental pathology, and dogs, rats and mice seem to be brought into the clinic more often than patients and animal experiments sometimes seem more important than clinical observations at the bedside.

These newer medical schools are integral parts of a great university but not so closely amalgamated with the university as one generally finds in Germany. The Cornell Medical School, for example, is situated in New York City while the University is in Ithaca, several hundred miles away.

The clinical teaching in these medical schools is being given in gigantic buildings and large hospitals, but in many of these hospitals one finds only a hundred to a hundred and fifty beds for the medical and surgical clinics, which is no more than one would find in a small clinic in a German university.

There is rich clinical material in the larger municipal hospitals and state institutions which is not fully utilized.

The hospital facilities for medical schools in many other countries are far better than in the United States.

Pre-Medical Education

Pre-medical education is carried on in colleges and universities where there are courses in classics and especially in mathematics and natural sciences. Doubtless American students are better trained in physics, chemistry and natural sciences and mathematics than German students at the beginning of their clinical semester.

In these institutions, a large amount of time and interest is devoted to sport.

Modern languages are taught in nearly all of the American schools, but there is a lack of knowledge of French and German among American doctors which does not compare with the foreign languages used by European physicians. It is much more difficult for the American physician to learn these languages, as the opportunity for using them is far less than for the continental physician.

Students see a great deal of each other—become one large family and develop a sense of loyalty for their own university and rarely change from one university to another as is so commonly done in Germany.

Teaching in the Medical Schools

The medical schools in the States are free institutions as a rule, and it is not uncommon to find that the number of students is limited to one hundred or less in the first year, a very careful selection having been made.

There is a strong control maintained over the students and they are required to attend their classes regularly. This is similar to the teaching methods employed in German gymnasia, but the American medical student lacks the freedom for learning which is highly prized in Germany. This is a danger for weak pupils and limits the independence upon which Americans place so much stress.

The American medical student has already received his training in the natural sciences before he begins his medical course, and he then begins his first year in medicine with physiology, anatomy, pharmacology, bacteriology and pathology, and each student is required to devote a considerable amount

of time to experimental work on frogs and to use scientific apparatus. Clinical clerkships are common and students are required to act as a clerk during their two clinical years. This is a useful method, and it is a typically "work school" and far better than lectures. This method is carried out in the study of internal medicine, but not so commonly applied for the specialties.

The differences between teaching in the United States and Germany are well explained in Abraham Flexner's book. The German students have lectures and exercises which cover the entire subject and Professor Müller thinks that they have a far greater value than the way they are carried on in England and America. Prominent teachers who have used this method are Osler, Billroth, Trousseau, Charcot, Frerichs and Gerhardt. It is a difficult problem to consider relative values of this "work method" limited to the study of a few individual patients contrasted with the encyclopedic method demonstrated by the lecture system.

The full-time system of teaching is increasing and sometimes the teachers are required to devote a definite number of hours to their work in the clinic. They are sometimes allowed to have a consulting practice, but the fees are turned over to the hospital. These full-time physicians are limited in their salaries and their economic and social position is not as favorable in general as in Germany, Switzerland and the Scandinavian countries, and they generally have less influence. When the professor grows older and his family needs increase, he not infrequently retires to undertake a profitable practice. In this way, many American clinics have lost some serious-minded and able workers, and the public is the loser in not being able to secure the highest type of clinical teacher as a consultant. The definitely fixed salaries prevent that wholesome competition which exists in the German universities. Students are required to take this or that course and are not able to choose as in Germany between two professors, each of whom receive students' fees in accordance with the number of students taking his course.

Hospitals

The cost of medical care in the hospitals is high, amounting to

as much as six or eight dollars a day. There are special clinical departments in the hospitals, but one rarely sees a special clinic or hospital beds for the specialties connected with the medical schools.

The hospitals are far better constructed than they were twenty years ago, when wards were poorly lighted and ventilated and the halls narrow and dark.

The medical services in the hospitals, however, are limited to only a few months of the year in most places and sometimes a few beds in a ward are divided between two or more physicians. Interns spend one or two years in the hospital, and in many of the municipal hospitals there is a noticeable lack of the older and more experienced physician who in Germany remains on as Chief Physician during a period of years. In a number of the newer clinics, however, a director of the service has been appointed who has entire charge of the clinic throughout the year.

CONVALESCENT CARE

New York City is fortunate in the number of Homes providing convalescent care for adults and children in poor or moderate circumstances. Physicians who are unaware of these opportunities for their patients or as to the method of taking advantage of them can obtain the necessary information, free of charge, from the Convalescent Service of the Hospital Information and Service Bureau of the United Hospital Fund, 151 Fifth Avenue, Telephone Algonquin 7100.

DEATHS OF FELLOWS

JAMES ANTHONY KEARNEY, M.D., 127 West 58th Street, New York City; graduated in medicine from the University of Pennsylvania, 1918; elected a Fellow of the Academy January 3, 1918; died November 29, 1927. Dr. Kearney was a Fellow

of the American Medical Association, Ophthalmologist at Polyclinic and Gouverneur Hospitals; Visiting Ophthalmologist at the State Hospital for Crippled Children, Haverstraw, and Ophthalmologist at the Polyclinic and French Dispensaries.

FREDERICK JAMES SCHWEIKART, M.D., 26 Victor Place, Elmhurst, New York; graduated in medicine from Long Island College Hospital, 1905; elected a Fellow of the Academy January 3, 1918; died December 27, 1927. Dr. Schweikart was a Fellow of the American Medical Association, Neurologist at St. John's Hospital, Assistant Neurologist at the Queensboro Clinic and Post-Graduate Dispensary, and Consulting Neurologist at the Flushing Hospital.

NEWTON MELMAN SHAFFER, M.D., 31 East 49th Street, New York City; graduated in medicine from the University of the City of New York, 1867; elected a Fellow of the Academy December 4, 1879; died January 2, 1928. Dr. Shaffer was a Fellow of the American Medical Association, a Fellow of the American College of Surgeons, a member of the American Orthopedic Society, the Orthopedic Society, and Consulting Surgeon to St. Luke's and State Hospital for Crippled and Deaf Children at West Haverstraw.

SAMUEL STERN, M.D., 40 East 51st Street, New York City: graduated in medicine from P & S, Columbia, 1896; elected a Fellow of the Academy October 6, 1927; died November 22, 1927. Dr. Stern was a Fellow of the American Medical Association, a member of the American Roentgen Ray Society, Radiological Therapist at Mt. Sinai Hospital and Chief Radiological Therapist at the Mt. Sinai Dispensary.

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PAPERS DELIVERED AT THE STATED MEETING OF OCTOBER 6, 1927

THE COST OF MEDICAL SERVICE

(Abstract)

LOUIS I. DUBLIN, Ph.D.

Statistician, Metropolitan Life Insurance Company, New York

It has been estimated that sickness costs the United States a total of over two billion dollars a year, and this is three and one-half per cent. of the country's total income. Two per cent. of the population is at all times so ill as to require medical attention. Their care necessitates the services of more than 150,000 physicians, 50,000 dentists, 300,000 nurses (trained and practical) and 100,000 additional attendants of various kinds. When the cost of hospitals, convalescent homes and other institutions, as well as drugs and surgical appliances is included, it is not difficult to account for the two billion dollar estimate.

It is unfortunate that no very satisfactory data are available to show what the average family pays per year for medical service. Data do not cover at all that large group of the population generally described as "the middle class," or people having an annual income ranging between \$3,500 and \$20,000. Practically all our existing information concerns the wage-earning groups of the population. A study of annual expenditures for the various items in the family budget, made some years ago by the U. S. Bureau of Labor Statistics among 12,000 workingmen's families, showed the average expenditure for sickness care to be about \$60 a year. Clerical workers of a large insurance

company—a somewhat more prosperous group, spent approximately \$80 a year per family for sickness.

A sum of sixty, eighty, one hundred, or even a hundred and fifty dollars, is not a large enough amount to embarrass unduly the average family, were it not for the fact that sickness is so unevenly distributed. During many years, the ordinary family may go along without any heavy outlay, though there will undoubtedly be slight expenditures for drugs, dental care and other health incidentals. But when a maternity case occurs, or an illness requiring long-continued treatment or perhaps an operation, the family faces a very serious emergency. Surgical care is relatively very expensive, even when low-priced hospital wards are utilized. Surgeons and specialists' fees, nursing services and private hospital accommodations make the cost staggering for people with moderate incomes.

This situation is nobody's fault. The average family doctor does not charge exorbitantly in view of the long period of education which medicine requires, the heavy overhead of his office, and the other factors which he must consider to make a living. The average earnings of physicians in the United States are only about \$3,000 to \$3,500 a year; and the skill demanded of doctors more than justifies such a rate of compensation. Other factors, however, complicate the situation. First, the fees charged by specialists and surgeons are out of all proportion to those received by the average general practitioner who, after all, is burdened with the heaviest responsibility for the health and well-being of his patients. Second, the concentration of physicians in the cities leaves a serious dearth of skilled doctors in our rural areas. Most doctors, moreover, grade their charges according to the patient's ability to pay; though no other business or profession is run on such a plan. And finally, private medical practice from its very nature is bound to be expensive because of the waste of the doctor's time, the idleness of the expensive equipment which he must maintain, and the other inefficiencies of organization inherent in the system.

What is the way out of this impasse? A few developments of recent years are highly suggestive. Group medicine, although the word is anathema to some of the medical profession, would

seem to offer a partial solution. There are in existence already a number of interesting and successful experiments. We may mention in passing the extremely valuable service being rendered by the Cornell University Pay Clinic, which is now running on a practically self-supporting basis; the number of patients on its books is steadily increasing and apparently the service rendered is acceptable to an ever-expanding group of patients. In the colleges, universities and secondary schools of the country, medical departments have been organized on a group basis and these furnish excellent health care to the student body at nominal cost. In industry there has been a phenomenal growth in industrial hygiene and an ever-increasing number of medical departments are being organized by employers for the avowed purpose of conserving the health of their workers. These experiments are worthy of the most careful attention and study. Valuable experience is being collected which we will be able to utilize wisely in the future. Of course, underlying any plan of group medicine and fundamental to its success would be the principle that all members of the medical and surgical staffs should be compensated fully and fairly for all services rendered.

And, finally, there is one remedy which does not concern the organization of medicine at all, but that seeks to build up funds with which to pay medical bills when sickness occurs. The modern idea of insurance is based on the principle that large numbers of people voluntarily banding together for their own protection may easily, through the payment of fixed premiums, provide funds to meet the various contingencies of life such as death, unemployment and ill health. Health insurance is an established institution abroad; and apparently on the whole, the compulsory systems established in Germany, England and other European countries are working out successfully. At least, there has been no tendency to cut down their scope and there is every indication that the medical service which they render is as good as the great mass of working people have ever hitherto enjoyed. We do not favor compulsory health insurance in this country; for it is obviously counter to popular sentiment. But we do maintain that there are enough private insurance companies in the United States who are able to carry this type of

insurance efficiently and economically with benefit to all concerned. Millions of American wage-earners are now covered by either personal or group health insurance. In the last analysis, we will solve our economic problem of sickness costs only when health insurance becomes as popular among wage-earning families as industrial life insurance now is. In advocating health insurance there is no attempt to interfere with the highly personal relationship now existing between patient and doctor; what we have in mind is to formulate a plan whereby there will be assured funds to meet the doctor's just fees, when they become due.

THE PREVALENCE OF ILL HEALTH¹

EDGAR SYDENSTRICKER

*Statistician in the United States Public Health Service, and Statistical
Consultant to the Milbank Memorial Fund*

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Nearly 350 years ago, Christopher Marlowe had *Faustus*, in his soliloquy upon the choice of a profession, weigh the success of medicine in these words:

“Summum bonum medicinae sanitas.

The end of physic is our body’s health.

Why, Faustus, hast thou not attained that end?

Are not thy bills hung up as monuments, whereby

Whole cities have escap’d the plague, and

Thousand desperate maladies been cured?”

So to-day, without the pessimism or the sophistry, I hope, of the master of the black art and surely without his motives, we may apply his test in measuring the success of preventive medicine. It is true that plagues and pestilences such as those which flourished in Marlowe’s and Shakespeare’s day have been ban-

¹ From the Office of Statistical Investigations, U. S. Public Health Service.

ished from the modern part of the world at least; that many more maladies have yielded to modern treatment; that millions of sick have been relieved from their suffering and that millions more have escaped disease and have lived lengthened lives. These achievements are monuments indeed to the discoveries, the science, and the unselfish art of medicine. Yet the goal of preventive medicine, which is a healthy people, is far from being reached and the *curative* skill of a great army of physicians is still needed. Why have we not attained that end?

In response to the invitation with which you have honored me I can not presume to attempt an answer to so comprehensive a question. You, better than any others, know the prevalence of disease in our day and generation, and I shall not be able to add to that intimate knowledge you have gained by daily experience with the sick and the impaired and by researches out of which you have made so many valuable contributions to the science and practice of medicine. But perhaps as a collector and analyst of facts in the mass, who has devoted some years to an attempt to delineate the problems of health in statistical terms, I can be of some service in summarizing, in crude outline, what we know about the prevalence of disease in our population. Surely it will do us no harm—indeed, it is necessary to the proper development of effective prevention of ill health—for us to have a glimpse now and then of the situation as a whole.

Before attempting to do this, however, I suppose we should try to define what we mean by ill health and to select the scale by which we are to measure it.

ILL HEALTH A RELATIVE TERM

What is ill health? To say that ill health is a deviation from "normal" health is merely to indulge in one of those impressive but unsatisfying dictionary definitions. For, how much of morbidity itself is "normal" reaction, in the process of natural adjustment to environment, as Haldane suggests? How many impairments and conditions, commonly denoted as "disease," are merely signs of "normal" wearing out of human clocks, some of whom, to use Pearl's metaphor, are set by heredity to run a longer time than others? When is death itself "normal"—at

three score years and ten, or at the century mark, or at 200 years, or even at Methuselah's reputed age? How long a time, in fact, did Methuselah take to *die* in? I am afraid that so purely philosophical a consideration will lead to nothing more than obfuscation. So let us concede at the outset that health or ill health is a relative thing, measurable at present only by some assumed standard with which we are all more or less familiar, even if not in strict agreement upon. In fact, no criterion can be very exact for several reasons, one of which is that physicians, upon whom we depend for most of our data, do not agree invariably in their diagnoses. Yet the statistical picture, if we do not try to fill in too much detail, will not be without interest and considerable accuracy.

INDICES OF ILL HEALTH

The indices of ill health at present available to us for statistical purposes are:

- (1) Death rates, specific for sex, age and cause, or some life table expression such as the expectancy of life or the probability of dying at a given age;
- (2) Morbidity rates among persons of given sex and age based either upon the frequency of sickness from a specific cause during a given period of time, or upon the prevalence of illness from such a cause at an instant in time;
- (3) Physical impairment rates among persons of given sex and age for a specific type of impairment as ascertained by an examination or by repeated observations.

It is understood, of course, that unless a group of persons is selected for some specific purpose, the group for which we desire these indices of ill health should be a fair sample of the population.

The inadequacy of death rates as indices of ill health.—The use of death rates as indices of the prevalence of disease has been so universal that the problems and aims of public health are set forth almost entirely in lethal terms whenever statistics are used. This is unfortunate. One effect of a prolonged dependence upon mortality statistics has been to vitiate in some degree the mortality statistics themselves. For, by reason of a laudable

desire to ascertain the prevalence of tuberculosis or cancer, for example, vital statisticians have classified deaths under that title even when the attending physician reports it on the death certificate as merely contributory to the actual cause as he observed it. More deplorable than this statistical practice is the gradual education of the physician himself into this procedure. Another effect of too great emphasis upon mortality statistics has been to foster a fallacious premise for public health work, namely, that a low death rate necessarily indicates the absence of ill health. Obviously it does not. We know that, on the contrary, an exceedingly unhealthful region may exhibit a mortality which is not extremely high, as, for example, a heavily infested hookworm locality, or a section abounding in malaria. Pellagra may be widely prevalent in a community without affecting materially its general death rate or even causing a large number of deaths from the disease itself. Instances of the same sort could be multiplied. Much ill health that is manifested in symptoms, in discomfort, in lessened vigor and efficiency, even in illness and suffering, is not reflected in the death rate, except for certain diseases, for any practicable purpose in preventive work.

What really matters more to the sanitarian and the physician, therefore, in their scientific searching for causes and conditions and in their preventive work, is not deaths but *ill health*. Of far greater importance than mortality rates and life table expressions is a view of the health situation depicted by *physical impairments* as revealed by competent medical examination, and by morbid conditions as ascertained by adequate records of *sickness*. If such a view were permitted, it will hardly be denied that the resulting change in perspective would lead us to modify considerably our schemes for research and our program of effort.

I shall not, therefore, use mortality rates in this brief discussion on the prevalence of ill health except in an incidental way.

The kind of indices needed.—Furthermore, it must be obvious from clinical experience as well as from considerations of a practical nature that the full extent of ill health and its kinds can not be ascertained by any one method. Properly conducted physical examinations, supplemented by the necessary laboratory findings, furnish certain indispensable indications of the existence and the new results of various diseases and conditions; but they

will not tell the whole story. A carefully obtained history of prior attacks of disease, symptoms, and exposure to certain possibly relevant conditions for each individual will add to the picture. Of undoubted importance is a period of observation during which the reactions of the individual under ordinary as well as under extraordinary circumstances are recorded; this record may be of the occurrence of various symptoms and of the extent to which the subject is affected—whether only slightly ill, or more or less continuously “below par,” or unable to engage in his usual activities, or disabled for long periods, or dying. The detail and accuracy with which these observations are made depend, naturally, upon the means employed. Unfortunately no such combination of records is yet available for any considerable sample of our population, and for the present we must be content with observations made according to one method for one sample and records obtained by another method for another.

WHAT PHYSICAL AND MEDICAL EXAMINATIONS SHOW

Let us consider first the findings from physical examinations. Such records are numerous but unfortunately they are not comparable as to terminology or as to the methods employed. I shall refer to but three series of records which probably approximate more closely than other series what the medical findings would be for samples of the general population.

One series is the reported defects in about two and one-half million men registered and examined in pursuance of the selective service act in 1917–1918. All of us are more or less aware of the unavoidable weaknesses of these findings, due principally to the fact that they were not made primarily for a complete appraisal of the health of these men. The gross results, however, are illuminating. Another sample is that afforded by the examinations made by the Life Extension Institute as recently reported by Dublin, Fisk and Kopf, covering nearly 17,000 male policy holders of the Metropolitan Life Insurance Company. (See Table 1.) A third sample consists of about 10,000 employees of industrial establishments who were given physical examinations by medical officers of the United States Public Health Service in the course of its studies in industrial hygiene, as reported by Britten and Thompson. (See Table 2.)

TABLE 1

NUMBER OF CERTAIN PHYSICAL IMPAIRMENTS PER 1,000 MEN EXAMINED
AT DIFFERENT AGES*

16,662 white males insured in the Metropolitan Life Insurance Company,
Ordinary Department, 1921

Impairment	All ages	Age group				
		Under 25	25-34	35-44	45-54	55 and over
Number of persons in specified age group	16,662	861	5,885	5,799	3,023	1,094
Nose and throat:						
Enlarged septic or buried tonsils.....	262	340	328	256	171	130
Hypertrophic rhini- tis, enlarged tur- binates	148	190	169	151	107	101
Teeth and root infec- tion:						
Pyorrhea, definite ...	48	12	27	57	71	74
Heart and pulse:						
Mitral murmur, ste- nosis	2	2	2	1	2	4
Mitral murmur, re- gurgitation	7	3	7	5	9	15
Aortic murmur, ste- nosis	1	-	1	1	-	2
Aortic murmur, re- gurgitation	-	-	-	-	1	1
Blood-vessels and blood pressure:						
Marked arterial thickening	6	1	4	3	7	37
Blood pressure, 60 or more above average	3	1	-	1	7	23
Stomach; abdominal organs:						
Hemorrhoids	123	44	93	128	177	163
Inguinal hernia, no truss	22	14	14	22	31	48
Inguinal hernia, truss worn	29	2	14	26	51	82
Urinary findings:						
Albumin, marked amount	8	14	7	7	9	12
Sugar, marked amount (quanti- tative)	5	1	3	3	10	11
Casts, granular or epithelial	4	3	-	5	7	8
Casts, hyaline	41	42	30	40	53	75
Indican	39	31	40	40	37	44

* Data from Dublin, Fisk and Kopf: "Physical Defects as Revealed by
Periodic Health Examinations."

TABLE 2

NUMBER OF DEFECTS AND DISEASES PER 1,000 EMPLOYEES OF VARIOUS INDUSTRIAL ESTABLISHMENTS AT DIFFERENT AGES*
10,062 White Males Examined by Medical Officers of the United States Public Health Service, 1914-1924.

Impairment	All ages	Age group									
		Under 20	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60 and over
		494	1,405	1,845	1,739	1,561	1,127	813	510	305	263
Number of persons	10,062										
Digestive:											
Constipation	158	109	118	133	186	153	189	183	165	170	228
Other digestive¹	81	73	59	69	84	80	102	87	110	79	87
Eye and ear:											
Inflamed eyes	120	71	81	106	105	138	146	175	165	138	129
Impaired hearing	212	81	104	131	158	208	260	326	365	443	502
Other ear defects	55	51	56	62	55	57	46	53	51	56	49
Heart:											
Organic heart	37	18	21	32	35	26	52	45	61	65	87
Enlarged heart	39	30	34	30	29	31	51	50	65	62	110
Irregular heart	20	34	15	18	15	19	19	17	18	36	53
Other circulatory:											
Arteriosclerosis—											
Marked	32	4	8	14	19	27	49	49	75	105	167
Slight	67	12	36	48	49	70	77	99	141	148	198
Hernia, varicose veins, etc:											
Hernia	99	53	67	89	90	108	121	127	127	128	182
Enlarged rings	26	14	27	34	26	35	18	20	18	23	8
Varicocele	53	40	46	50	52	60	48	81	43	46	49
Varicose veins	59	4	21	27	55	78	81	111	102	128	99
Flat feet—											
With symptoms	16	6	15	18	25	21	17	2	12	13	4
Without symptoms	161	103	198	184	187	169	147	122	102	92	76

TABLE 2—(Continued)

Impairment	All ages	Age group									60 and over
		Under 20	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	
Number of persons	10,062	494	1,405	1,845	1,739	1,561	1,127	813	510	305	263
Loose and throat:											
Chronic diseases of nasal pharynx	428	330	491	493	458	440	381	367	331	302	266
Enlarged tonsils	169	222	218	219	171	174	115	116	98	79	38
Diseased tonsils	103	85	95	114	114	106	110	106	75	79	49
Respiratory:											
Tuberculosis	25	10	16	23	26	37	21	33	29	13	23
Bronchitis (acute and chronic)	45	45	26	39	37	49	60	52	73	59	49
Emphysema	11	—	2	5	5	12	15	27	31	36	27
Skin	81	87	111	95	77	72	79	68	51	36	34
Teeth:											
Pyorrhea	296	83	177	231	291	356	392	415	400	387	388
Defective teeth	305	215	182	199	240	352	390	459	502	544	536
Miscellaneous:											
Hemorrhoids	104	4	45	75	106	119	142	170	149	190	148
Venerical diseases	9	10	12	14	9	4	6	6	10	7	8

* Data from Britten and Thompson: "Health Study of 10,000 Male Industrial Workers."

1 Includes diarrhea.

Now, although the findings of these three series of physical examinations are not as comparable as we would wish and although they in all probability are a *minimal* statement of the actual conditions, they afford facts which are of grave import to sanitarians and physicians. I shall try to summarize them in a single sentence: A large proportion—the exact percentage, whether it be ten or thirty, does not matter just now—of our adult population at ages when they ought to be at their fullest vigor have serious impairments of the respiratory, circulatory, digestive and eliminatory systems, and are actually affected with diseased conditions, which result sooner or later in morbid states, with varying degrees of inefficiency, suffering and fatality.

WHAT SICKNESS RECORDS SHOW

The most satisfactory measure of ill health that we now have is morbidity, and it is to some new statistics of sickness that I wish to invite your attention for the remainder of my remarks.

You are familiar, of course, with the extensive sickness surveys made by Dr. Dublin and his associates which showed that the *prevalence rate* of sickness in a large sample of our population is about 2 per cent. By this prevalence rate we mean that 2 per cent. of the population was found to be actually sick at a given instant in time and, since the observations were made in urban as well as rural areas, upon persons of both sexes and all ages, and at different seasons of the year, may be used as the basis for an estimate that not less than 2,300,000 persons, probably more, of our population are constantly sick.

Another way of measuring the amount of ill health is by the frequency, or the *incidence rate*, of sickness during a given period of time. Considerable European as well as American experience has been accumulated showing the number of illnesses of various durations and degrees of severity. Since most of this experience relates to special groups, I shall not attempt to summarize it here. Instead, I venture to present the gross results of a morbidity study covering a general population group which was under observation for over two years. So far as my associates and I are aware, this is the most extensive record of this kind yet made.

THE HAGERSTOWN MORBIDITY STUDY

This study, which has come to be known as the "Hagerstown morbidity study," included 16,517 "years of observation," or an equivalent of a population of 7,079 persons observed continuously for 28 months. Only white persons, practically all of whom were native born, were included. No predominant industry is situated in this city of 30,000 population, and it may be said to be typical of many other cities of its size in the eastern section of the United States. The principal objective of this study was a record of illnesses that were experienced by a population group composed of persons of all ages and both sexes, and in no remarkable respect unusual. The records of "illness" obtained were of illnesses as reported to experienced field investigators who visited each family every 6 to 8 weeks, the reports being made by the household informant (usually the wife) either as experienced by herself or as she observed them in her family; the definition of the term thus can not be refined any further than the common understanding of the word, although the diagnoses in practically all illnesses having medical attention were confirmed by the attending physicians. Since *attacks* rather than ill health were recorded, the record of persons affected with chronic conditions is complete to the extent to which these persons suffered ill effects of these conditions *during the period* of observation.

The results of the study indicated that we had secured a fairly accurate record of real illnesses. As a matter of fact, less than 5 per cent. of the illnesses of exactly stated durations recorded were one day or less in duration. Nearly 80 per cent. were three days or longer, and 60 per cent. were eight days or longer in duration. Approximately 40 per cent. were not only disabling but caused confinement to bed. It is evident, therefore, that in the main the illnesses recorded were more than trivial in their character, in spite of the fact that in some instances mere symptoms were given as diagnoses. The incidence of acute attacks of specific and generally recognizable diseases, was, we feel, recorded with a satisfactory degree of completeness. On the other hand, the incidence of mild attacks, as for example, of coryza, was quite incomplete as judged by records of minor

respiratory attacks obtained later upon other population groups.

The gross illness rate.—A total of 17,847 illnesses were recorded, which gave an annual rate for the 28 months period of 1080.5 per 1,000 population, or about one illness per person per year. The death rate was 9.3 per 1,000. The annual incidence rate for illnesses was 116 times the annual death rate in the same population; it was 107 times the annual death rate of the total white resident population of Hagerstown. If this ratio of illnesses to deaths is anywhere near that which would be found for the general population, the guess may be ventured that upon a rate of 1.0805 annual illnesses lasting three days or longer per person, the illnesses in 1922–23 among the population of the United States would have approximated the impressive total of 120 millions per year. If one takes the death rate in the mortality registration area as a basis, which was about 12.05 per 1,000 in 1922–23, and the ratio of 107 illnesses per death, the still more imposing total of over 140 million illnesses per year would be indicated. One hesitates to stretch the validity of a study of a small sample, however carefully made, by using it as the basis of broad estimates for larger populations. If it pleases any one to play with figures in this manner, probably these estimates are not so far off.

The results of such a study can not be presented in detail in a single paper, but I shall select three phases that may be of especial interest to you, namely: (1) The variation in the morbidity rate according to age; (2) the general nature of the conditions recorded; and (3) the extent to which sickness in this sample population received medical and hospital care.

The illness rate at different ages.—When we consider the frequency of illness among persons of different ages, as is shown in Table 3 and Fig. 1, two rather striking indications were given by this series of observations. First, the extraordinarily high incidence of sickness shown in early childhood was a rather surprising result. Illness was far more frequent under 10 years of age than at any other period of life. Second, the interesting suggestion was afforded that the average individual is most free from illness in the age period 15–24 years. Thereafter, sickness

TABLE 3
INCIDENCE OF ILLNESS FROM ALL CAUSES AMONG A GROUP OF WHITE
PERSONS OBSERVED IN HAGERSTOWN, MD., DECEMBER 1,
1921-MARCH 31, 1924

Age, in years	Annual rate per 1,000	Number of illnesses
0- 4	1,588	2,822
5- 9	1,554	3,270
10-14	1,187	2,034
15-19	764	1,062
20-24	712	809
25-29	825	1,020
30-34	920	1,136
35-44	924	2,006
45-54	1,009	1,691
55-64	959	863
65 and over ..	1,080	875

becomes more frequent as age advances² and, it may be added, upon the basis of other studies as well as our own, sickness becomes more severe and more frequently fatal.

The question naturally suggests itself: Just what does this variation according to age in the morbidity rate mean? Does it indicate that a greater proportion of the population in one age group was sick than in another, or does it signify that the higher incidence rate was due to the greater frequency of sickness in a sickly moiety of the group? Or do both conditions prevail?

"Sickly" and "well" persons in different age groups.—A more satisfactory answer could be given had we the time to consider the details of the causes and conditions of the illnesses recorded, but a broad interpretation of one meaning of the morbidity curve is suggested by the distribution of the individuals within each age group according to frequency of illness during the period of observation. Selecting those individuals who were under observation for 26 months or longer, excluding children under two years of age, and classifying them into two groups—(a) those suffering no illness during the entire 26 months' period, and (b)

² Industrial sickness experience sometimes shows a declining frequency as age advances in the age group 20-44, which apparently is due to an elimination of sickly individuals and to an adjustment to industrial environment on the part of those who remain at work.

FIG. 1

AGE INCIDENCE OF ILLNESS FROM ALL CAUSES

AS OBSERVED IN A GENERAL POPULATION GROUP
IN HAGERSTOWN, MD.,
DECEMBER 1, 1921 - MARCH 31, 1924

Rate
per
1,000

1500

1000

500

0

Age

0

10

20

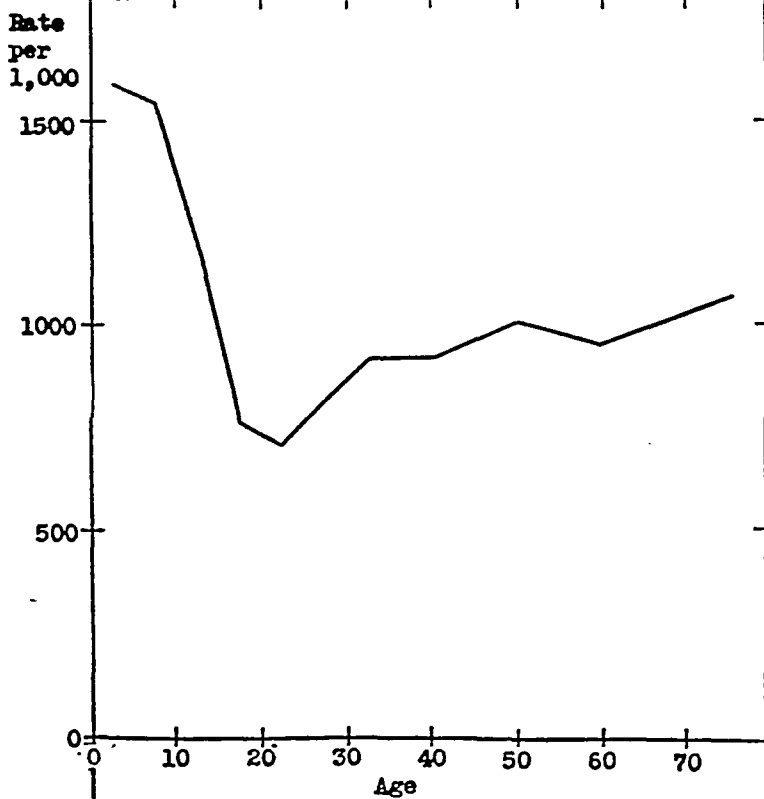
30

40

50

60

70



those ill four or more times, two age curves appear in sharp contrast—the “curve of good health,” as indicated by the proportion of persons free from illness, which is lowest in childhood, sharply rising through adolescence to its maximum in the early adult years, and thereafter gradually declining until the end of the life span, and the “curve of ill health,” as indicated by the proportion of persons suffering frequent illness, which is almost the obverse. (Table 4, Fig. 2.)

TABLE 4

PROPORTION OF WHITE INDIVIDUALS IN HAGERSTOWN, MD., OBSERVED FOR 26-28 MONTHS, WHO WERE FREE FROM ILLNESS OR WHO SUFFERED FREQUENT ATTACKS, BY AGE GROUPS

Age, in years	Per cent. of total in each age group	
	Not ill	Ill 4 or more times
2-4	4.7	44.4
5-9	7.4	45.5
10-14	14.8	27.1
15-19	25.7	14.3
20-24	29.6	10.5
25-29	23.9	16.4
30-34	22.8	18.4
35-44	25.0	21.2
45-54	21.5	22.6
55-64	21.2	21.9
65+	15.7	20.0

Resistance to death at different ages.—The further query suggests itself: At what age is the individual least able to withstand disease after he has been attacked? One way to measure this is to compare the number of illnesses per death at different ages. (Table 5, Fig. 3). This shows that the greatest resistance to death is in childhood, the age period 5-14; his lowest resistance is in infancy and early childhood (0-4 years), and in middle and old age. Ability to survive illness thus varies markedly from resistance to illness at different ages, particularly in childhood (5-14), when the average individual suffers from illness frequently but has a relatively small chance of dying, and in the

FIG. 2

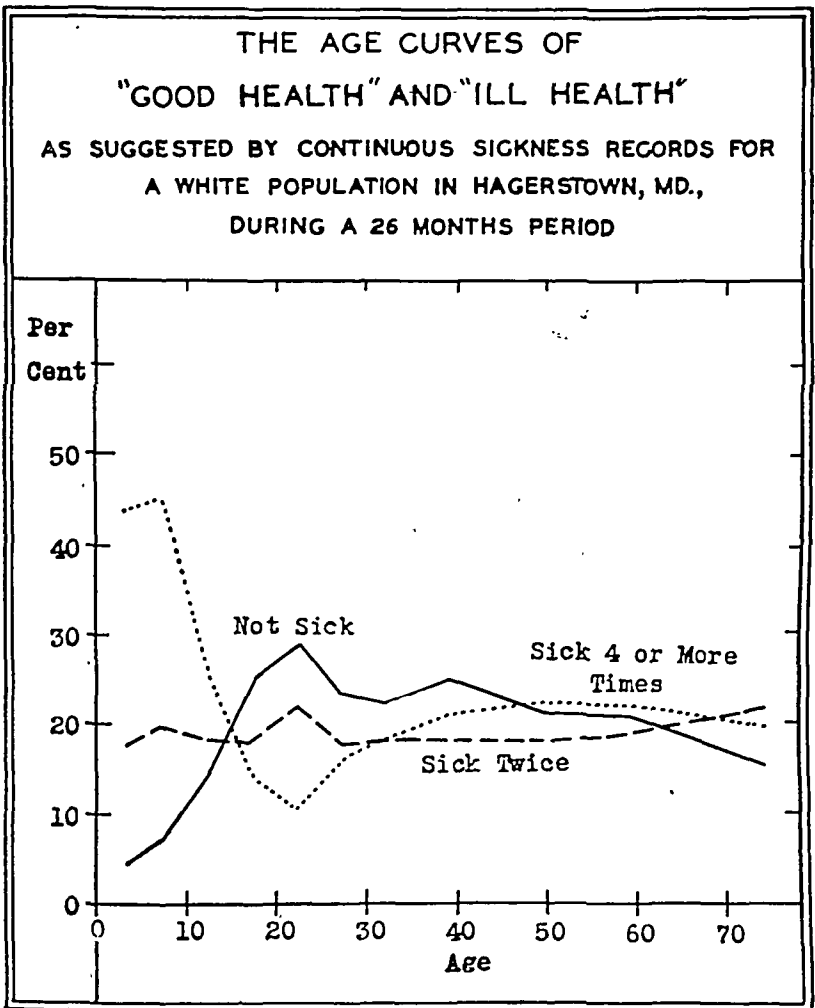


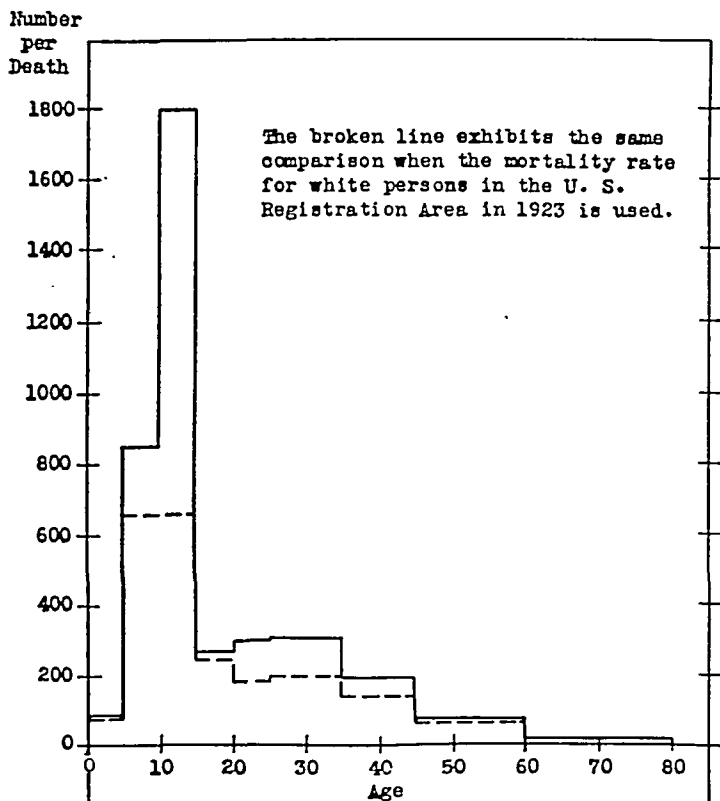
TABLE 5
RATIO OF ILLNESSES TO DEATHS AT DIFFERENT AGES

Age, in years	Annual rate per 1,000 of population			Number of illnesses per death		
	Deaths in registration area of United States in 1923			Illness rate in observed white population in Hagerstown, Md., to death rate in—		Disabling sicknesses to deaths in total membership of Leipzig Sick Fund, 1887-1905
	Dec. 1, 1921-Mar. 31, 1924		Deaths in total resident population	White resident population of Hagerstown, Dec. 1, 1921-Mar. 31, 1924	White population of registration area, 1923	
	Illness in an observed group	Deaths in total resident population				
0-4	1,588	17.56		90	74	.....
5-9	1,554	1.83		850	661	.....
10-14	1,187	.66		1,798	659	383
15-19	764	2.90		263	246	129
20-24	712	2.47		288	180	79
25-34	872	2.89		304	193	70
35-44	924	4.85		191	139	52
45-64	991	14.34		69	61	26
65 and over.....	1,080	83.08		13	13	12

FIG. 3

NUMBER OF ILLNESSES PER DEATH AT DIFFERENT AGES

IN THE WHITE POPULATION OF HAGERSTOWN, MD., DURING THE PERIOD
DECEMBER 1, 1921 - MARCH 31, 1924



definitely morbid effects, although they undoubtedly shorten life and make life less efficient and enjoyable while it lasts.

The prevalence and kinds of "chronic" conditions.—The prevalence of "chronic" conditions, as ascertained by a continuous series of observations upon the Hagerstown group, has a pertinent interest here. For details I shall refer to the accompanying table (Table 7), but some of the more frequent conditions may be mentioned. Of each 1,000 individuals on the average, 34 were affected with arthritis, lumbago and myalgia, 22 with neuralgia, neuritis and sciatica, 22 with neurasthenia, 21 with diseases of the heart, 7 with asthma and hay fever, 10 with chronic indigestion and other intestinal disorders, 10 with appendicitis, 7 with biliary calculi and calculi of the urinary passages, 7 with nephritis and 10 more with other kidney conditions, and so on.

The extent of medical service rendered.—We should not conclude this brief discussion without some consideration of the extent to which preventive, curative and relief activities of public health agencies, the medical profession and hospitals are dealing with the prevalence of disease. So many reports and volumes have been written upon the nature and scope of these activities, that it would be impossible even to summarize the salient facts. I venture to present, however, briefly, the results of a study from an entirely different angle, namely, *the extent to which a fairly typical population is actually the recipient of the services which these activities afford.*

That less than half of the illnesses recorded in the Hagerstown study were attended by physicians (Table 8) may be regarded in one sense as an understatement of the extent of medical services rendered because many of the illnesses recorded were mild cases that ordinarily do not require medical attention. It must be clearly understood, of course, that we are not speaking of "visits," but of *cases*; the number of visits per case was not ascertained, although for an adequate study of medical services it certainly would be a pertinent item for inquiry. Just what cases ought or ought not to have a physician is a question about which opinions will differ, and it was found that the proportion of cases attended varied with their nature (disease), discomfort,

TABLE 7

ILLNESS IN A GENERAL POPULATION GROUP

Prevalence of certain chronic conditions resulting in illnesses during a 28 months' period in a general population group in Hagerstown, Md.

Diseases or conditions (numbers in parentheses refer to those given in the International List of Causes of Death, 1920)	Rate per 1,000 individuals observed		
	Both sexes	Males	Females
Tuberculosis, pulmonary (31).....	5.71	3.60	7.69
Tuberculosis, nonpulmonary (33-36)	1.28	.96	1.58
Veneral diseases (38-40)	3.61	1.44	5.65
Cancer (43-49)	2.33	.72	3.85
Tumors, benign (50).....	.82	.48	1.13
Rheumatism (51-52)	28.65	20.16	36.64
Lumbago, myalgia, myositis (part of 158)	5.36	5.52	5.20
Rickets (56) .....	.47	.72	.23
Diabetes (57)	1.40	.48	2.26
Anemia (58)	1.51	.24	2.71
Goiter, exophthalmic (60a).....	1.05	.24	1.81
Paralysis (75)	3.14	2.16	4.07
Epilepsy (78) .....	.93	1.44	.45
Chorea (81)	1.86	.96	2.71
Neuralgia (part of 82).....	13.16	6.00	19.91
Neuritis and sciatica (part of 82).....	8.62	3.84	13.12
Neurasthenia and nervous exhaustion (part of 84)	22.36	6.72	37.10
Diseases of eye (chronic) (85).....	1.63	1.44	1.81
Diseases of the heart (87-90).....	21.19	13.68	28.27
Arteriosclerosis (part of 91).....	3.38	3.84	2.94
Hemorrhoids (part of 93).....	2.10	2.16	2.04
Varicose veins and phlebitis (part of 93).....	1.05	.72	1.36
High blood pressure (part of 96).....	2.56	1.68	3.39
Asthma and hay fever (105, part of 107)	7.10	6.48	7.69
Ulcers of stomach and duodenum (111).....	.93	1.44	.45
Chronic indigestion, constipation, and other stomach or intestinal conditions (112, 114, 119)	9.90	6.96	12.67
Intestinal parasites (116)	2.68	3.36	2.04
Appendicitis (117)	9.90	6.00	13.57
Hernia (118)	2.45	3.36	1.58
Biliary calculi and calculi of the urinary passages (123, 132).....	6.64	3.36	9.73
Cholecystitis (part of 124).....	2.79	.72	4.75
Unqualified and other liver conditions (part of 124)	3.26	2.16	4.30
Nephritis, (acute and chronic) (128, 129)	6.99	6.00	7.92
Unqualified and other kidney conditions (131)	9.78	5.52	13.80
Diseases of bladder (133)	4.77	3.36	6.11
Diseases of male organs (135, 136).....	1.40	2.88	—
Chronic diseases of female genital organs (137-142)	8.15	—	15.83
Menopause (part of 141).....	4.31	—	8.37
Congenital malformation (159-161).....	1.78	1.20	2.27

TABLE 8

THE EXTENT OF MEDICAL AND HOSPITAL SERVICE IN A TYPICAL SMALL CITY

Per cent. of cases of illness, classified by broad groups according to cause, occurring in a white population group in Hagerstown, Md., which received medical and hospital care, Dec. 1, 1921-Mar. 31, 1924

Groups of causes (Numbers in parentheses refer to those in the International List of the Causes of Death, 1920)	Number of ill- nesses for which informa- tion was obtained	Per cent. with specified type of service	
		Attended by physician	In hos- pital ¹
All diseases	17,217	46	1.34
Diseases of the respiratory sys- tem (11, 31, 97-107, 109) ²	10,461	34	.21
Epidemic, endemic, and infec- tious diseases (1-42, except 11 and 31).....	1,423	61	.77
Other general diseases (43-69)...	335	68	5.07
Diseases of nervous system (70- 84, part of 205).....	686	49	.87
Diseases of eyes and annexa (85)	119	61	.....
Diseases of ears and mastoid process (86)	175	64	5.14
Diseases of circulatory system (87-96)	287	83	1.74
Diseases and disorders of diges- tive system (110-127, part of 108 and 205).....	1,555	58	4.05
Diseases of teeth and gums (part of 108)	118	59	.....
Diseases of kidney and annexa (128-134)	175	87	4.00
Nonvenereal diseases of genito- urinary system (135-142)	180	78	18.89
Confinement and other puerperal conditions (143-150)	390	98	3.59
Diseases of skin and cellular tissue (151-154, part of 205)	278	55	.36
Diseases of bones and organs of locomotion (155-158, part of 205)	103	64	5.83
Congenital malformations and infancy (159-163)	19	89	5.26
Senility (164)	11	64	.....
External causes (165-203).....	638	73	1.57
Ill-defined and unknown	137	50	1.46

¹ Hospital cases included in per cent. "Attended by physician."

² Excluding 127 tonsilleotomies and other operations (nonrespiratory) on throat and nasal fossae.

and severity. Thus, only 34 per cent. of respiratory attacks received medical attention as against over 80 per cent. of illnesses resulting from diseases of the nervous system and of the kidneys. If we omit "colds" and minor digestive disturbances, which numbered about 7,500 of the total cases recorded, we find that 65 per cent. of the remaining cases were attended by physicians.

TABLE 9

MEDICAL AND HOSPITAL SERVICE IN A TYPICAL SMALL CITY

Distribution, according to disease group, of illnesses receiving medical and hospital care in a white population group in Hagerstown, Md., December 1, 1921-March 31, 1924

Diseases (Numbers in parentheses refer to those in the International List of the Causes of Death, 1920)	Per cent. each disease group is of total	
	Attended by physician	In hos- pital ¹
All diseases	100.0	100.00
Diseases of the respiratory system (11, 31, 97-107, 109)	44.7	9.57
Diseases and disorders of the digestive system (110-127, pts. 108 and 205)	11.3	27.39
Epidemic, endemic, and infectious diseases (1-42, except 11 and 31)	10.9	4.78
External causes (165-203)	5.8	4.35
Confinements and other puerperal conditions (143-150)	4.8	6.09
Diseases of the nervous system (70-84, pt. 205)	4.2	2.61
Diseases of the circulatory system (87-96)	3.0	2.17
Other general diseases (43-69)	2.9	7.39
Diseases of skin and cellular tissue (151-154, pt. 205)	1.9	.43
Diseases of kidney and annexa (128-134)	1.9	3.04
Nonvenereal diseases of the genito-urinary system (135-142)	1.8	14.78
Tonsillectomy, adenoidectomy, and others ²	1.6	9.57
Diseases of ear and mastoid process (86)	1.4	3.91
Diseases of eyes and annexa (85) .....	.91	—
Diseases of teeth and gums (part of 108) .....	.88	—
Ill-defined and unknown .....	.86	.87
Diseases of bones and organs of locomotion (155-158, part of 205)	—	2.61
Congenital malformation and infancy (159- 163)	—	.43
Senility (164)	—	—

¹ Hospital cases included in per cent. "Attended by physician."

² Eight other operations on throat and nasal fossae included.

The distribution of the physician's cases according to condition or "cause."—Or, looking at the question of medical services rendered from the point of view of the physician (Table 9), we find that nearly half of the cases attended by physicians in a typical small city were respiratory attacks, 11 per cent. are diseases and disorders of the digestive system, and another 11 per cent. those diseases which are commonly grouped under the general heading "epidemic, endemic and infectious." Two-thirds of the physician's cases fall in these three classes—respiratory, digestive and infectious. About 6 per cent. are cases arising from "external causes," chiefly accidents, 5 per cent. are confinements and conditions incident to childbirth, and 4 per cent. are due to diseases and conditions of the nervous system. These results have been confirmed by the more recent morbidity reports obtained from physicians in a rural area by the New York State Department of Health. From these more extensive data for a half-year period, we may estimate that the average rural practitioner had about 1,020 cases per year (exclusive of communicable diseases) of which 316 were respiratory, 130 digestive disorders, 120 surgical and 47 gynecological, 76 neuroses, 75 tonsillitis, 47 heart diseases, 43 acute rheumatic fever and arthritis, 19 acute and chronic nephritis, 9 venereal, 6 diabetes, and 6 cancer.

PROBLEMS YET UNSOLVED

It is hardly necessary to make any general observations upon the picture of disease prevalence which has been sketched so roughly, but I would like to reiterate two comments that, however obvious and trite they may be, gather importance as our particular kind of civilization develops.

The first is that public health has as yet barely touched the task of *preventing* the conditions which manifest themselves in physical and mental impairments, in inefficiency and illness, and in postponable death. Plagues and pestilences have been diminished, infant and child mortality from infections and intestinal disorders has been lessened, and healthful living is being established more and more firmly as a popular ideal, but aside from
¹ Ho: the prevalence of disease remains as an outstanding prob-
² Excl. throat and yet unsolved.

The second is that under the present organization of medicine this problem of disease prevalence is largely in the domain of private medicine. Speaking as an individual, I am inclined to believe that it ought to continue so if for no other reason that the personal relation between physician and patient is essential to effective medical practice, whether it be curative or preventive. But we can not shun, even if we choose, two exigencies. One is the development of *preventive* practice on the part of the physician if he continues to bear the responsibilities that the prevalence of disease imposes. The other is the economic problems involved, which I leave to Dr. Dublin to discuss.

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ABSTRACTS OF PAPERS DELIVERED AT SECTION MEETINGS

Section of Historical and Cultural Medicine

December 16, 1927

THE INFLUENCE OF HABIT IN THE EVOLUTION OF MAN AND THE GREAT APES*

HENRY FAIRFIELD OSBORN

In the study of human evolution, which has been an established principle ever since 1871, when Darwin published his classic work, we have now reached a period where many interesting new lines of inquiry converge: The fossil ancestry of man; the embryonic development of man; the comparative anatomy of man; the study of man in what may be called the higher aspects of modern anatomy. To-night I shall speak along the line of the conclusions drawn from these converging studies, but I must limit my subject to the influence of habit on human evolution and the bearing of that aspect of the subject on a burning question in anthropology to-day, namely, what kind of ancestors have we had?

Habit is king, and whether acquired adaptations are inherited or not, it is the destiny of all parts of the human body which do not serve a useful purpose to drop finally out of the scale and disappear. It is prolonged habit alone, after centuries and thousands of years, which determines the rise and decline of parts. Every great group of animals, including the anthropoid apes and man himself, tells this story. Man, particularly, moulds and modifies his form by his habits, his mode of living; different races of man, through prolonged and repeated choice

*The fifth in a series of papers on human evolution, the preceding four having been presented as follows: (1) "Fundamental Discoveries of the Last Decade in Human Evolution," New York Academy of Medicine, April 7, 1927; (2) "Recent Discoveries Relating to the Origin and Antiquity of Man," American Philosophical Society, April 28, 1927; (3) "Recent Discoveries in Human Evolution," Medical Society of the County of Kings, May 17, 1927; (4) "Recent Discoveries Relating to the Origin and Antiquity of Man," *Palaeobiologica*, Band 1, December 7, 1927.

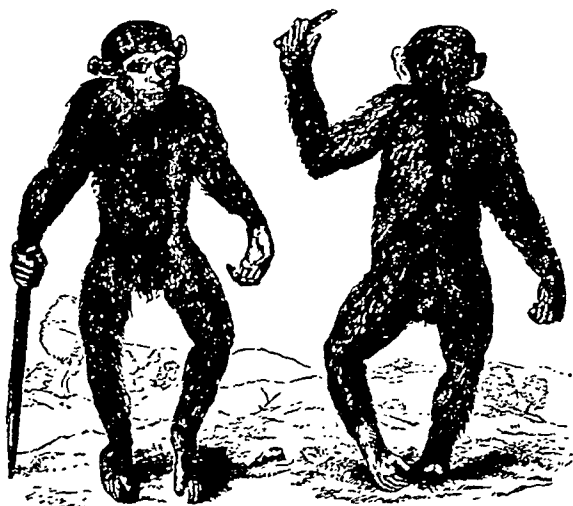


Fig. 1. Chimpanzee figured as a "Pygmie" by Tyson in 1699.

of one mode of life or another, mould their racial anatomy. For example, there is great contrast between the walking and the tree-climbing types, the running and the swimming types of man.

The group of men assembled here to-night to discuss this subject compose a society working in New York and throughout the country known as the Galton Society, named after Sir Francis Galton, cousin of Darwin; they are making their convergent researches in the greatest harmony, so that you will be disappointed if you expect to hear a discussion of the kind that took place between the Bishop of Oxford and Huxley, or in the famous Society of the Stanislaus described by Bret Harte, which, you will remember, ended by their throwing fossil bones around the room! Our discussions are entirely amicable; we understand that the emotional element should never enter into a scientific discussion or inquiry, nor should the personal element. The mind should be what Huxley described as a clear, cold engine of thought, without temperature. Consequently, although we are each deeply interested in our own aspect of the subject, we do not allow temper or temperament to modify our opinions.

In his "Descent of Man" Darwin, in 1871, gave a description, remarkable at the time, of his conception of our primate

ancestry. Like all of Darwin's writings, it is presented in a qualified way; I have not found in Darwin's works anything clearly specifying what kind of primate gave rise to man, whether lemur, monkey, or anthropoid ape. He leaves that question open, but he defines in an excellent way the character of our ancestral type and finally inclines toward the anthropoid ape. After Darwin's time, when his remarkable work was chal-

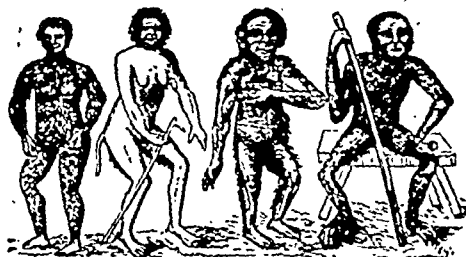


Fig. 2. The Anthropomorpha of Linnaeus. Left to right: *Troglodyta Bontii*, a fictitious "ourang-outang;" *Lucifer Aldrovandi*, an imaginary man-ape; *Satyrus Tulpii*, probably from the orang; *Pygmaeus Edwardii*, probably from the chimpanzee. Linnaeus knew nothing of the man-like apes but borrowed his views from his pupil Hoppius.

lenged, anatomists the world over were compelled to seek for evidence and to put their hands on the first evidence that could be found, so that it was in Huxley's "Origin of Man," published ten years after Darwin's work, in Haeckel's "Anthropogenie," and in subsequent writings, that the ancestral theory took more definite shape and scientific hypothesis began to concentrate on the anthropoid ape type as most closely resembling man. In their zeal, the resemblance was traced in every way, not only by anatomists away back toward the end of the eighteenth century—Buffon, Lamarck, those early Frenchmen of genius—but long before that by the natives who lived among the anthropoid apes of southern Asia and Africa.

ORIGIN OF THE APE-MAN MYTH

Thus there grew up a myth regarding these apes. Their resemblances to human beings were grossly exaggerated by travelers and explorers, and even by naturalists, and the growing feeling that the anthropoid ape gave rise to man has been

based partly on exaggerated reports of the habits and postures of these strange animals. This error is found even in the works of such a relatively cautious scientist as Haeckel. I myself was present at Cambridge University when Haeckel, coming for the last time before the public, visited the museum, took out of it all the anthropoid ape skeletons and a human skeleton, and before his learned audience raised them all alike into an erect position—an unintentional falsification of evidence.

From such supposed evidence as this and from figures like De Bry's of 1598 has arisen the popular, wholly unscientific



Fig. 3. One of the earliest representations of the simian or snub-nosed type, probably suggested by an early traveler who had seen an orang. After De Bry, 1598.

concept of the apes and gorillas as walking erect and even as capturing native women. We now know that apes do not stand erect, any more than do dogs or horses, except when they rear, as the gorilla does, in anger, and that a gorilla does not carry off negro women. Fremiet's sculpture illustrating this idea was a gift to the American Museum of Natural History, but it will never be exhibited, because in the Museum exhibits we are trying to present only truth and to eliminate all misrepresentations of ape and human resemblance. This false concept has also dominated the stage and literature; and I shall be glad to welcome the

day when the actual structure of apes is generally known and these vicious falsifications of natural history are corrected. A study of the tree-climbing or super-arboreal gibbon in motion shows him balancing himself with long fore limbs; he cannot walk in the quadrupedal position, because the fore limbs are so much longer than the hind limbs.

Travelers also represented these animals as extraordinarily human in shape; consequently, part of the accepted scientific



Fig. 4. Skeletons of anthropoid apes placed sub-erect in line with man in an entirely unnatural standing position by Haeckel. The gibbon alone, in walking and running, approaches this erect attitude. Left to right: gibbon, orang, chimpanzee, gorilla, man.

evidence is based upon misconception of their movements. Here again is the matter of habit. The structure of apes, like the structure of man, is an intensification and perfection of habit. In the recent researches of Professor Morton of Yale on the foot of the gorilla, it is shown that the baby gorilla is born with what might be called an arboreal type of foot, but that the adult gorilla, owing to his walking about on all fours, with his tremendous weight on his feet, gradually loses the distinctively gorilla type of foot; the big toe approximates the other toes, so that in the adult gorilla the foot is much more human-like than in the young gorilla.

NEW ANATOMICAL EVIDENCE

About three years ago I was a firm believer in the anthropoid ape theory of ancestry. I listened to a series of most able papers given by a number of investigators—Doctors Tilney, Morton,

McGregor, all members of the Galton Society—and felt then that by their investigations the anthropoid ape theory was quite established. A year later, however, I went into the central desert of Asia, in Mongolia: there I came under the influence of a new environment, a desert or semi-arid environment, and it flashed across my mind that this must have been the primitive home of man, that anthropoid apes could not have existed here. From that time to this the idea has been growing upon me, and last April, at the bicentenary meeting of the American Philosophical Society, I stated that I personally had abandoned the anthropoid ape theory and I advanced the opinion that man has a long line of Dawn Man ancestors and that the other theory rests upon a large amount of evidence which proves the *kinship* of anthropoid apes to man but does not prove the *ancestry of man through an anthropoid ape type*.

There is all the difference in the world between *kinship* and *ancestry*. When we come down to what we all believe in—to an anthropoid stem stock, a group from which both the anthropoid apes and man were derived—we get a neutral form which cannot be defined as either an anthropoid ape or man, but with that type, which has the potentiality of the human stock on the one hand and of the anthropoid ape stock on the other, we come to a parting of our ways, somewhere back in Oligocene time, millions of years ago.

Sir Arthur Keith, in his brilliant address before the British Association, widely published in the press, adheres to the older anthropoid ape view; he says: "All the evidence now at our disposal supports the conclusion that man has arisen . . . from an anthropoid ape not higher in the zoological scale than a chimpanzee." This question is therefore crystallized and presented afresh by one of the most distinguished living anthropologists, who with no uncertainty nails his colors to the anthropoid ape mast and impresses it by a graphic illustration. His chart (Fig. 5) illustrating his conception of man's origin* shows the branching off of the various types—the brachiating or limb-swinging type represented by the gibbon going off at the lowest point, then a stem from which branch human beings and the anthropoids (the orang, chimpanzee and gorilla).

*Keith: *Origin of Man*, p. 10. London, Watts & Co., 1927.

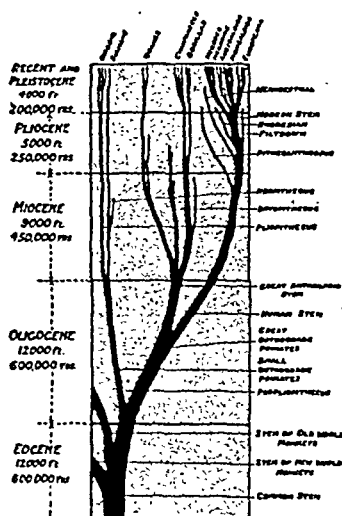


Fig. 5. Sir Arthur Keith's conception of the origin of man. The human stem (right) branches off from the great anthropoid stem (center); from a separate and much older anthropoid branch (left) the gibbon is given off.

In the family tree according to Gregory (Fig. 6) the anthropoid stock shows four branches (the four great apes) given off



Fig. 6. Professor W. K. Gregory's well-known model (1924) in the American Museum of Natural History, in which *Dryopithecus* is placed on the same branch (upper) as the various fossil and recent human races. The gibbon (lowest branch) branches off at an earlier period from the simian anthropoid stock. This closely approaches Professor Osborn's theory (fig. 8).

from *Dryopithecus* (signifying "forest-ape"), and at the base the Trinil type and branches leading up to man. Morton's family tree (Fig. 7) gives early radiation of the ancestral primates

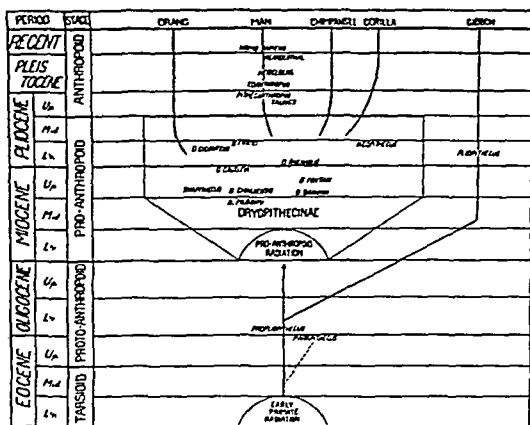


Fig. 7. Dr. Dudley J. Morton's conception of the relation of human and anthropoid stems as indicated by analysis of fossil teeth and their relative chronological position.

(lemurs, *Tarsius* and the proanthropoids) in Lower Miocene time, about the same geologic epoch as Keith's; here we find *Dryopithecus* or tree-living apes, with man in the center, the chimpanzee and gorilla at one side and the gibbon, the extreme arboreal type, at the other; this is again a theoretical concept of an arboreal anthropoid group from which man separates and begins his distinctively human career. My own chart of 1927 (Fig. 8) separates the human stock from the ape stock in Oligocene time, the ape stock going off by itself with *Dryopithecus*, in ascending order to arboreal types: gorilla, chimpanzee, orang, gibbon. Gregory's theory and Keith's differ from mine only in the fact that in the stem I separate very early the family of the *Hominidae* from the family of the *Simiidae*, to which the anthropoids belong. The differences set forth in these four charts are partly differences of opinion and of definition, but they are also differences of concept.

NEW PHOTOGRAPHIC EVIDENCE

In trying to set forth and defend the reasons for my ^{little} concept I am having recourse to photographs and moving pictures of living apes especially selected to illustrate the points of disagreement, namely, foetal comparison, limb structure and proportions, physiognomy, habits of locomotion and posture. The

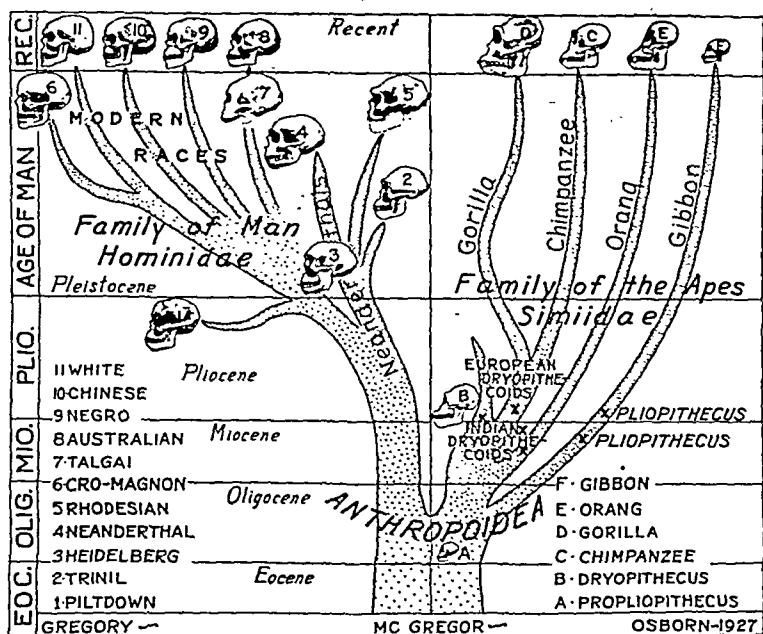


Fig. 8. The separate origin of the human (left) and anthro/poid (right) stocks from a common pro-man and pro-ape stage in Oligocene time. After Osborn, 1927.

problem can be studied more clearly by examination of these photographs both of human beings and of anthropoids. The photographic material has been brought together by The New York Zoological Park, particularly through the efforts of Curator Ditmars in securing moving pictures, and by the American Museum. I doubt if there is any city in the world richer than New York in material for research, and the combined work of these two institutions has made New York one of the chief centers of research in this fascinating problem of human evolution.

I shall begin with the motions of the anthropoid apes and try to show through four series of lantern slides the characteristics of each of the types, in descending scale from the tree tops—the gibbon, the orang, the chimpanzee, which is partly arboreal and partly terrestrial, and the gorilla, which becomes so large and powerful and so capable of self-defense that the



Fig. 9. Native Burmese boy and gibbon, showing wide difference in limb proportion, the gibbon with long arms, the boy with short, slender arms. Scene from "Chang," a Paramount photoplay.

males at least live chiefly on the ground, although the females and young still resort to trees for protection. The anthropoid apes originally sought the trees, as did the monkeys and the lemurs, for defensive purposes. In the final series of slides, however, will be shown the developmental embryonic, phylogenetic aspect of the subject, the result of the remarkable studies of Dr. Adolph Schultz.

The matter of limb proportion is of especial interest and is being carefully worked out in a series of ratios and indices by Gregory and Shapiro, in collaboration. In the chimpanzee the outstretched arms greatly exceed the height, whereas man can stretch his arms only to the limit of his height. This disparity

varies, from the hyper-arboreal, tree-living stage down to the ground-living stage: there is less disparity between the fore and hind limbs of the orang than of the gibbon, and one photograph of a West African gorilla makes the limbs appear nearly equal, although in fact the fore limb is longer than the hind limb. The contrast in limb proportion between a native Burmese boy and

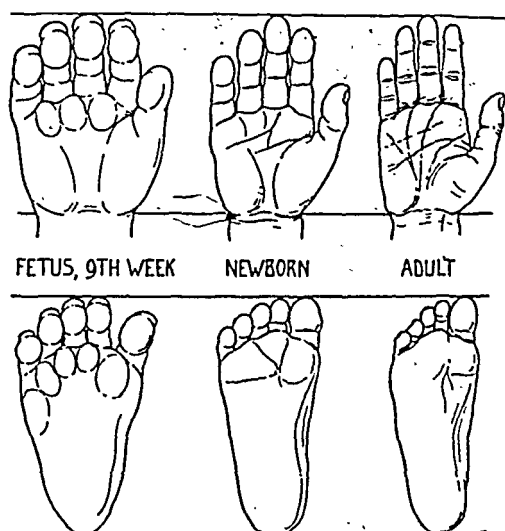


Fig. 10. Growth changes in human (white) hand and foot. After A. H. Schultz, 1926.

a gibbon is strikingly shown in the current photoplay "Chang." The long slender arms of the gibbon are his protection in his tree-living existence, enabling him to swing rapidly from branch to branch as his enemy pursues him.

Coming to the comparison of the hand and foot of the anthropoid apes with those of man, we find the apes with diminished, non-opposable thumb and elongated, hook-like fingers, and with enlarged big toe. To the tree-living gibbon, particularly, the thumb is utterly useless—in fact, a real danger—as he swings through the trees, grasping the branches with fingers held hook-wise, as the human trapeze performer supports himself; the thumb is still useful, however, in grasping food, and the thumb of the orang is more developed than is that of the gibbon, although the orang, too, is a tree-liver. The great toe is useful in tree life, helping the animal to support his body on either a

broad or narrow branch. In the Kivu Mountain region of Africa the gorilla foot more nearly resembles that of man, but even the detailed studies of Carl Akeley in this and other regions do not show the anthropoid apes as closely resembling man in other characters—in fact, they firmly establish the distinctions between man and the apes, even the gorilla, in several respects

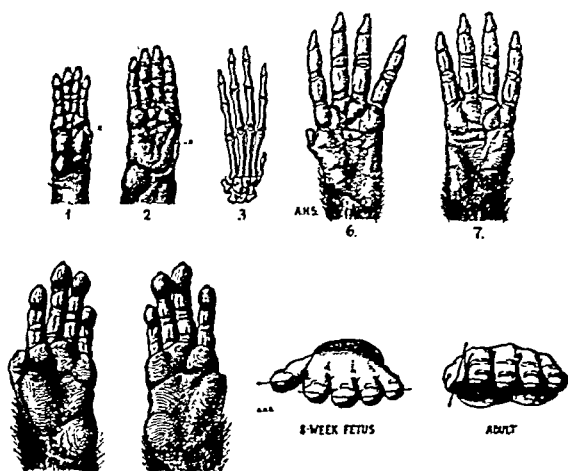


Fig. 11. Illustration of thumb reduction in the fully arboreal primates like the monkeys and lemurs (Nos. 1-7). Lower right: Separating fingers of the foetal human hand of the eighth week, and the adult hand with inturned thumb. After A. H. Schultz, 1926.

the highest type of ape. The gorilla's limbs are of nearly equal length, owing to the difference of position of the sockets of the respective bones; thus the back of the animal is nearly horizontal, though actually the fore limb is longer than the hind limb. The gorilla has only a rudimentary thumb, with which he holds the food, and a large big toe widely separated from the foot and the other toes; except in the Kivu gorilla above mentioned.

Of peculiar interest is the physiognomy of the anthropoid apes, in comparison with that of man. The face of the orang is most humorous, with its long upper lip, snub nose, from which the family name *Simiidae* is derived, prominent supra-orbital ridges, and retreating forehead. The chimpanzee has

a larger face than the orang, with smaller ears and less prominent eyebrow ridges. The brow ridges develop progressively with age: the young chimpanzee is practically without brow ridges, while the adult chimpanzee has this feature well developed, with consequent retreating forehead. This comparison is also made in the Neanderthal race of human beings; the Ne-

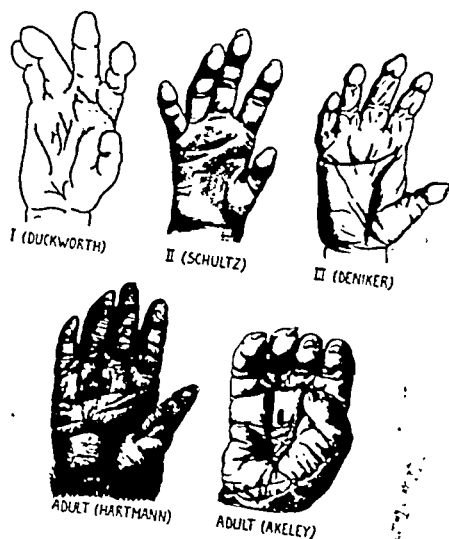


Fig. 12. Hands of gorilla, all reduced to same total length. Upper row: foetuses; lower row: adult *G. Gorilla*, after Hartmann (1880) and adult *G. beringei*, after Akeley (1923). *Memoirs Carnegie Museum*, Vol. XI, Pl. V.

anderthal brow ridges are feeble in infancy but prominently developed in the adult. In the matter of physiognomy the gorilla, in many respects least like man, in other respects most like man, also shows inequality of resemblance to human beings.

TREE-CLIMBING IN APES AND MAN

The anthropoid apes, owing to differences in limb structure and limb proportion, also to hand and foot formation, have entirely different habits of locomotion to man, particularly in climbing. The adult apes seldom climb a bare trunk, although certain apes and monkeys can shin a tree. A man shins up, with the soles of the foot turned in as they are in newborn infants.

In walking, the great apes take a quadrumanal position, progressing on the knuckles, not on the open palm of the hand as monkeys and other quadrupeds do. As has been pointed out, the apes rise to an erect position in defense, but come down again to their customary quadrupedal position.

Most enlightening are the extensive studies of Dr. Adolph Schultz in embryology, in which foetal characteristics in man

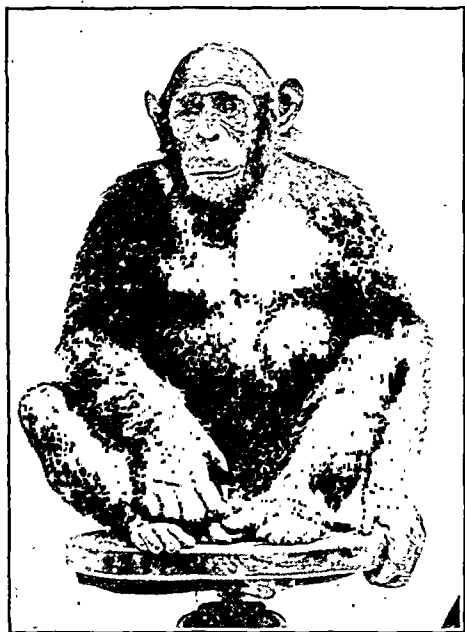


Fig. 13. A typical chimpanzee in the New York Zoological Park, with hand and foot placed close together to contrast the greatly reduced thumb (pollex) and enlarged big toe (hallux). After Ditmars, 1927.

and apes are compared; I think fifteen hundred human embryos have been examined by Dr. Schultz, and the result is a rare assemblage of unborn stages of the hand and foot, brought together for the first time, teaching in the main that man does not recapitulate the anthropoid ape type in individual development, except in certain characters. The embryo human hand is pro-human, not pro-ape. The embryo human foot is like that of monkeys and apes.

In the study of the influence of habit it is interesting to note certain types of man. The squatting type is exemplified by the tailor or shoemaker. Sir Arbuthnot Lane, in his great monograph on the influence of habit, carefully details the changes which the occupation of the tailor produces in his form and anatomy. The Hawaiian swimming type—Duke Kahonomoku, for instance—a race which takes to the water by instinct, is small waisted, broad chested, with broad shoulders and marvelous limb development. The running type, as studied in the Finn Nurmi, has a splendid chest, thorax and abdomen, feeble arms, but powerful legs. The ideal, well rounded human type is depicted by Tait McKenzie, the sculptor, whose well proportioned, well balanced statue of the ideal man is a composite of the measurements of a very large number of Harvard University students.

Science works by trial hypotheses. I have one hypothesis, my opponents have another. To my mind there is very strong evidence of the prolonged independent ancestry of man, an ancestry not of anthropoid ape type, but of a neutral, common type. I agree to many arboreal traces in human descent, but I dissent as to the geologic length of arboreal life which my opponents claim resulted in resemblance between apes and man: I dissent as to our ancestry from a type which had specialized as far in arboreal life as the anthropoid ape. My theoretic ancestor belongs to a pro-ape stage, which I call the Dawn Man line. But we are all keeping our minds open; only in that way can we get at the truth.

DISCUSSION

DR. RAYMOND L. DITMARS: The gorilla. In Elliot's monograph six races are recognized; that is, a species with six sub-species. This is a young specimen about five or six years old, or approximately that. It is difficult to gauge the exact age. It was brought from Africa by the late Mr. Garner. Interested in toys and curiously enough in pets! An interesting reaction here when the doll is taken from her.

One interesting thing was that these small animals, rabbits, guinea-pigs and young dogs, appeared to be fond of the gorilla. The chimpanzee. We are showing on this reel the four types

of anthropoid apes—we will call them types, because we realize that with the gorilla there are several races indicated, that is, six sub-species. With the chimpanzee, Elliot recognizes eleven distinct species.

This specimen at the time the film was prepared was about six years old. A comparison. The chimpanzee and the orang-utan. The orang on your right. This is an interesting study of ears. The ear of the chimpanzee is proportionately much larger than that of the orang-utan.

The interesting gait of the orang-utan as described by Professor Osborn, a walk upon feet and knuckles. It is well to bear that in mind. Later in this reel we will repeat that same view in a comparative way.

The orang, the third type of this group. A young specimen, a young male in fact, and at about the age of eight or nine years. Here the habit of placing leaves upon the head. This is actually a protection of the head against the heat of the sun. You might say a very crude type of sunbonnet.

At the age of about eight or nine years a ridge-like development is indicated around the face, and with a very old male is greatly pronounced. An interesting comparison of the gorilla and the orang-utan, and here again we note that great difference in the size of the ears.

The skin texture of the hands of anthropoid apes is more similar to the human than that of the monkey. In fact, there are parallelogramic lines. Here is an illustration of the difference of the thumb of the orang-utan and the well-developed member of the human hand.

While these things may appear a bit humorous, we have selected an opaque bottle to study a bit of psychology, in fact, to see how he will note the depth of the falling tide in that bottle. The scene is particularly interesting owing to the use of the thumb and after Professor Osborn's description of the shortened thumb, it would be well to glance occasionally toward the hand instead of studying the orang's body. Note the movements of that long hand. The scene indicates an average bit of orang psychology. No instinct prompts actions of this type. Here again we see that the thumb is a clumsy member. That

jacket is actually clawed away by the long fingers, in fact, grasped by the long fingers. Very clumsy and very crude in their manipulation.

The gibbon is the fourth type of anthropoid ape. Twelve species of gibbons are recognized, this being a very black species. This is one of the smaller species, although they are of fairly uniform size. It is able to run erect owing to the balance of those excessively long—we might say in considering these species—arms or fore limbs, but the gibbon is the only anthropoid ape type that is able to progress in nimble fashion in that position.

Just for the moment comparing a mere monkey with the anthropoid apes. Quite a crude type as regards mentality and its general actions as compared to those higher types. Incidentally, an Old World monkey and illustrating the use of the cheek pouches in storing the food. Check pouches are not indicated among any of the New York monkeys nor does the prehensile tail exist among Old World species.

Here we have come back to the anthropoid apes again, and we have purposely selected some newly-arrived specimens that are not trained, that are not accustomed to crowds and captivity, that have had but little observation and we are noting reaction after several experiments. These are very young specimens, possibly two and three years old, respectively. There is the gait again—on the knuckles and the feet. Sometimes in a hurry, in rather an incongruous way. Here also the affection for the sympathetic keeper. That is a man with whom the animal has immediately become friendly after a few hours contact.

Here is a comparison between two, three and five year old orang-utans. An experiment with these younger specimens. Nearby is a quiet spot and we will note the reaction after an examination of some ordinary toys.

Fear for the moment, but curiosity soon overcomes fear. These babies are but mildly interested.

There is one thing an orang will do. That is to imitate the method of human eating—and he is curious. It is difficult to get him to use a cup when the spout of the tea-pot appears to be so handy.

We are repeating that scene of the orang upon feet and knuckles. On account of his short legs and his long arms that position is natural and easy, but now note the difficulty with the human. These scenes were prepared at the suggestion of Professor Osborn. Note the great difference between these postures and those of the anthropoid apes. These boys are doing their best. We will follow this immediately with an ape again.

Now we have a good illustration of his short legs and long arms and easy position.

DR. W. REID BLAIR: It has been a very great pleasure to have had the privilege of hearing Professor Osborn discuss the influence of habit in the evolution of man and of the great apes. If Professor Osborn had not chosen to become a great paleontologist he might have become a very great physician, because he has that very happy and great faculty of weighing and taking note of negative facts, and we all realize that a physician needs to consider the negative instances as well as positive symptoms in making a correct diagnosis.

Man is often spoken of as the thinking animal, as if he were the only creature to possess the power of flooding the present situation with past experiences. Man has the highest intelligence because he has the greatest wants and the greatest mobility. Beings, without wants, could very well do without mind. The reason why animals have intelligence and plants none is that animals move about for their food while plants take what comes to them.

Professor Osborn has very well brought out that the cultivation of skill with the hands and fingers was probably the greatest stimulus to man's mental supremacy. And educators to-day have pretty well demonstrated that one of the best methods of developing the mind of the child is by insisting upon the constant use of the hands.

In remote times the earliest true men had probably simple minds, but perhaps one should not be too quick to assume to underrate intelligence even of primitive man.

However, the struggle for existence, which included defense, hunting and the building of homes and many other conditions, must have led to a great development of the cerebral functions; and migrations brought them under the influence of varied climatic conditions which, no doubt, influenced the central nervous system in no small degree.

It is well known how powerful is the force of habit in the very young. For instance, if a new born animal like the lion cub is allowed to suckle its mother only for a single day, it is much more difficult to rear it by hand. Perhaps the highest faculty man possesses is that by which he generalizes and forms conceptions of the abstract, and yet animals are not wholly without a semblance even of this faculty. That animals have intelligence or the power to conjure up pictures of absent ones is well illustrated by the grief of the dog at the absence of its master, and by the capacity of animals to dream. The small boy who owns a dog is not prone to slur the intelligence of his pet, for he talks to him, plays with him, imputes motives to him, and praises him as if the dog's thoughts and feelings were a counterpart of his own.

If we have an animal, for instance, like one of the anthropoid apes which was shown here to-night, exhibiting marked expressions of affection, sympathy, jealousy, or rage, can we doubt the analogy of the mental experience behind them to the feelings similarly manifested by man?

The higher animals possess and display the same fundamental passions and emotions that animate the human race, and these passions and emotions are readily recognized even by the ordinary observer. I have known a young chimpanzee made jealous when her keeper caressed an orang, to uncover her teeth, and with a peevish whine turn her back on him. I have seen a chimpanzee in a violent passion present a curious resemblance to a child in the same state. She screamed loudly with widely opened mouth and with the lips retracted so that the teeth were fully exposed. It is not unusual for the anthropoid ape confined for any length of time to become aware of his attractiveness and not infrequently to regard a cage mate with jealousy if this companion should attempt to trespass upon its own popularity. The chimpanzee is the most intelligent of all animals

below man. His mind approaches more closely to that of man and carries him farther upward toward the human level. He can learn more by training and learn more readily than any other animal. If the chimpanzee could have had the same advantages of culture, for the same number of years that the domestic dog has enjoyed for thousands of years in his association with man, we might today be witnessing a remarkable intellectual development in this animal.

It has long been my ambition to secure for the Zoological Park a building suitable for housing a collection of the anthropoid apes, where these highly intelligent animals could be studied by noted psychologists, and where definite information relative to reproduction might be obtained. I believe that a great deal of valuable data could be obtained through the observation and study of their mental traits and especially their capacities for solving simple problems. The psychologist would find a wide scope for his highly philosophical work in the study of the mentality of the anthropoid apes since they exhibit considerable differences in high function and offer a good foundation for the study of the more complex activities of the human mind.

DR. TILNEY: Many of us who speak in the discussion tonight are the ardent disciples or pupils of Professor Osborn. We recognize in him the outstanding figure in this broad field of human inquiry. Like the rest of the world we listen with the utmost respect to what he has to say and we find ourselves particularly in this attitude in his latest pronouncements concerning the evolution of man. It might seem presumptuous even for us to question in the slightest degree any of his recent opinions and if we seem to do so, we wish it clearly understood that we use the utmost reservation wherever our ideas seem to be in conflict with his.

I should like to give the evidence of the brain as bearing upon this problem. In doing so I find myself in the position in which I am totally unable to displace the honored anthropoid from his well-recognized position in the ancestral line of man.

Professor Osborn has dwelt largely upon what we may consider a late phase, the primate phase in evolution. I would like

to call your attention to certain phases that long antedate that, with the idea that unless such a long review is made, certain important factors in man's evolving may be overlooked.

I should, in fact, like to go back to the time when the mammal was first beginning to emerge from a reptilian stage, 135,000,000 years ago. Now, through all this enormous period of time there was one dominant keynote that was operating, in my judgment, upon the development in all respects, behavior and structure of the mammal and this keynote brought forth a new power that was not possessed by any of the vertebrates below the mammal. I have already tried to describe this power which is technically known as *neokinesis*. It is a new power of motor expression by means of which the mammal far transcends any of the lower vertebrates and which finally leads up to those extensive skilled acts which we see in man, which have produced his powers of speech and all the multitudinous performances of his hand by means of which he has conquered the earth and the air around it.

This marvelous new power of motor expression caused a structural change that was equally remarkable. It called into existence a new part of the brain, a part of the brain which had never existed before until the mammal made its appearance upon the earth. This new part of the brain we call the neopallium. It is more generally known as the cerebral cortex. What humanity is to-day and what it is not, is directly attributable to this portion of the nervous system. And it was not attained by any short or slow process. It came through great and devious way of development.

I believe that perhaps the most impelling motive which determined the development of this new part of the brain was arboreal habit, that is to say, living in the trees was the most important factor in bringing this new part of the brain up to its highest development.

If you consider all of the mammals which have lived, those which are extant now and those which are extinct, the great multitude of them all, it is perfectly clear although they all possess this remarkable new power of the brain, very few, if any of them, made much headway with it. But finally, some of

them, which we know as the primates, for one reason or another, were forced to take to the trees and there to live more or less permanently; and as a result of this arboreal life great changes began to take place, particularly great changes in the master organ of life, the brain.

I would like to show you some illustrations of how, from the earliest time when these mammals, the primates, took to the trees, the great steps forward were made.

This illustration, which was prepared for Professor Osborn and which he very kindly has allowed me to use, shows all of these points. Here we note the lowest horizon of primate organization when they first began to take to the trees as the lemurs and tarsius. Then later the mycetes and the macacus and the baboon. The gradual extension of the neopallium is carried on until we reach the anthropoid horizon. Finally in the human we find every area of the brain represented which was represented at the lower levels, all having undergone great expansion, which is consummated in the frontal lobe, especially in Broca's area, the area of speech, which has given man a transcendent advantage over all other animals.

These facts may be demonstrated by measure. I therefore prepared certain indices of the brain which show not only the structural advances in the pallium but its functional advances as well. In animals with wings, fins and paddles, such as fish, birds, reptiles and amphibia, the forebrain index is the lowest, increasing in proportion in animals with paws, hoofs and claws, such as dogs, bears and horses, and finally reaches its highest value in animals characterized by hands, fingers and fingernails. These animals are represented by the primates, including lemurs, monkeys, apes and man.

The notable expansion which takes place in this part of the brain is seen in the frontal lobe, that area of the brain necessary to all our higher judgments and to the development of personality. Measurements clearly show that starting with a low mammal, like the anteater, with nine per cent., we pass through all gradations to the greater expansion of man with forty-seven per cent. in his brain area of the frontal region.

It is not merely in these external appearances of the brain that these signs of evolutionary advance may be detected. I

have studied a number of these interval details and list here a few of them and also show in actual cross section and reconstruction some of these facts which indicate the unfolding that is taking place in the brain among the primates.

This body which I will show now is the inferior olivary body. It has to do with the coordination of eye, head and hand movements. In passing from the low mammals to the primates a great expansion takes place. At the same time another structure, a bundle of fibers which carries all motor expressions from the forebrain down to the levels of the spinal cord shows a similar expansion. So these two features in the brain are notable as showing this evolutionary development.

Graphic representations of these structures show the progressive development of the pyramid and olive. Immediately tree life is assumed and the primate order is well defined, reaching its highest development in man. The cerebral peduncle represents the main concentrated output of the cerebral hemisphere (the cortex). Here is shown the repetition of that advance in development when arboreal life was assumed, with a slight falling back in tarsius. But the question of tarsius is a debated one and probably this animal represents a form which stands at the lowest extremity of the primate order.

These types clearly indicate that a definite evolutionary process has been carried on in the brain and that its main incentive has been, as far as the primates are concerned, tree life (arborealism). That the effects of arborealism are clearly seen in the lowest of the primates, in the lemurs and tarsius and then they are seen in the intermediate primates, the baboons and the macacus monkeys, up to the preanthropoid stage as represented by gibbons.

Professor Osborn called your attention to the activities of the gibbon. I believe that any one who has seen the picture "Chang" and the white gibbon in that picture, will agree that gibbon is able to stand upright and walk and run. The factor which I think has played an important part in bringing about this erect posture is the brachiation which the gibbon is compelled to employ in its ordinary tree locomotion; that is swinging by the long arms from branch to branch. This factor of brachiation has not been a small one in developing the upright

posture. In a word, I believe arboreal life has played a tremendous part in the development of the human brain and we clearly see in human organization the effects of past arborealism. That, of course, means that man has passed through an anthropoid stage and that he has had a line of proanthropoid, prohuman ancestors among the primates.

ORIGIN OF HUMAN LIMB PROPORTIONS THROUGH CHANGE OF FUNCTION

PROFESSOR WILLIAM K. GREGORY: In opening the subject I can do no better than most cordially endorse the sentiments which Professor Tilney has just brought forward. I myself owe my introduction to the study of evolution and a very great part of my opportunities to study it, as well as a grounding in the principles of evolution, to our honored chief, Professor Osborn. And I wish first to bring out a few things that I learned in his course in vertebrate morphology a generation or so ago, but which I believe are very firmly grounded, and just as good to-day as the day in which these principles were taught to me. The first principle that I wish to speak of is the principle of the change of function. Here you see a figure of a seal and it takes only a slight inspection of the hands and feet of the seal, that is of its flippers, to see that those are hands and feet that have been covered, as it were, with gloves or mittens. One will have no difficulty in inferring from the anatomy of the seal and from the form of the skeleton that the seal is a made-over land animal which has suffered a great change of function.

Now with that change of function has come a profound change in proportions, in the relative lengths of the different parts one to the other. I was taught by Professor Osborn to believe that what he calls allometrons or proportions were not fixed, eternal things, laid down once for all and delivered to us, but that they were subject to change in the course of evolution: the seal gives you a splendid example of a thorough-going modification in proportions, especially in the limbs. In fact the limbs are particularly plastic in their changes of proportions. The seal is derived, we believe, from animals that progressed on all fours, like dogs, and their feet have undergone great enlargement while the proximal segments of the limbs are greatly shortened.

This slide will show you a paleontological example of a very profound change in the proportions of the limbs. It is a fossil whale in which the fore limbs have been entirely made over for life in the water, so that their proportions are utterly changed in every bone from that of the terrestrial ancestors. Here in the hind limb we see the reduction of the normal hind limbs. There are still the elements of the pelvis and the femur and the tibia, but they are greatly reduced, so that this change in function involves a diminution of some parts and an increase of others. In other words, we witness secondary alterations in the proportions of the limbs following upon change of habit.

This slide will give you another example which was worked out by another pupil of Professor Osborn's, Professor Bensley, of the University of Toronto. It shows the change in the proportion of the digits of the feet, assumed in the passage from a tree-living, grasping type of foot, seen at the left, to an extreme terrestrial, hopping type of foot, seen at the right.

These Australian mammals are what are called bandecoots, and they are all terrestrial in habit except the one at the extreme left, which is a tree-living member of the same order. Here you will see that the digits profoundly changed their proportions when arboreal life was changed to terrestrial life. The fourth digit of the hind foot became greatly enlarged. In this case the first digit of the foot, which is strongly divergent in the tree-living type, dwindles away and finally disappears.

This figure shows you what I believe to have been a profound change in the proportions of the digits in passing from the arboreal stage in primates to the terrestrial stage. In the lowest figure we have a primitive arboreal mammal such as Professor Osborn mentioned in one of his slides, which was taken by Dr. Matthew to be the starting point of all the placental mammals. It is a short grasping foot with a divergent first toe. In the second figure you have the oldest known foot of a primate. It is from the lower Pliocene of Wyoming and it is according to modern estimates about forty to fifty millions of years in age. That foot, together with other evidence, indicates that at that remote epoch the primates were thoroughly arboreal animals. They had the arboreal stamp deeply imprinted on every bone of the locomotor skeleton. They al-

ready had feet capable of grasping the branches, and they already had the characteristics that all primates down to man have, of flat nails, particularly on the first toe of the hind foot. That flat nail on the great toe is present in all primates up to and including man. In these intermediate forms you see how the great toe greatly increased in size (as I interpret the evidence), in the shift from the arboreal mode of life. In the terrestrial mode of life there was a profound change of proportions in the length of the digits, of such a nature that the great toe, being already the dominant element of the foot, increased still further and became the main anchor of the foot. The other toes had already begun to shorten, as we see in this baby gorilla, and that process of the shortening of the other toes is carried to an extreme in man.

But you will also see that in this feature the gorilla is structurally intermediate between man and the other primates, in respect to the shortening of its digits. That is, the other digits are shorter in proportion to the length of the foot as a whole. Also the gorilla first among the primates shows the development of the heel in a downward direction, so that it became a great supporting element in standing.

These figures are drawn to different scales. The left is Professor Schulz's outline based on X-ray examination of the fetal foot of the ninth week, and the right is the adult human foot. The bones from the X-ray pictures show that the first digit, according to him, at that stage is remarkably divergent. I hardly want any more completely arboreal foot to start from than that.

Here we have a comparison of the fore arm as a whole, the bones of the fore arm in a chimpanzee and two human stages. One is a Vedda, after the cousins Sarasin, and the other a European. We can see these are quantitative differences, not qualitative differences, between the skeletons of these three types. They are quantitative differences only. Qualitatively, they are the same. They have the same elements, only they are differently proportioned.

I was originally taught, and I still believe it profoundly, that proportions, like everything else living in the universe, have changed and changed profoundly. The excessively abbreviated

length of the digits in the adult man I believe is a secondary change of proportion, as well as the enlargement of the thumb. I infer that the thumb is a progressive member in man which has enjoyed an enlargement comparable to that of the great toe on the hind foot, on account of its increasing importance in function, and I entirely subscribe to the doctrine that "habit is king" in this matter of proportions.

I think this slide has already been shown you by Professor Osborn. It is Professor Schulz's contrast of the fetal stages with the adults of anthropoid apes and man. Now of course the fetal stages differ from each other, but they differ from each other less than the adult stages do. Sir Arthur Keith and others have pointed out that that is the way a great many new characters appear in the differentiation of new forms. They first appear in the fetal stages and they become more and more pronounced as growth proceeds. You will see in this series that the chimpanzee and the gorilla differ from the human fetus only in comparatively slight changes of proportion. Nothing nearly so profound as the difference between the length of the feet in the seals and that of their terrestrial forbears. In other words, I feel that Professor Schulz's evidence lends very strong support to the exceedingly close kinship of man and the anthropoid apes and points to the separation of the two at a moderate geological distance, perhaps in the Oligocene as Professor Osborn suggests.

PROFESSOR DUDLEY J. MORTON: Probably the most fortunate element of this occasion lies in the opportunity it affords of reiterating a statement of the relative position and importance of the two problems, 1) Human Evolution and 2) the point of origin of the human stock.

Human Evolution represents the major problem of man's origin and development in its broadest scope. The question as to when and where the human stem began is an issue of relatively minor importance—a matter of detail. Too frequently, controversy within our ranks is interpreted on the outside as an actual refutation of Human Evolution on the part of certain of our members, or at least that our convictions have rather

insecure foundation. Therefore, in an open meeting of this sort, it would seem desirable to repeat and clearly to define the position of the two problems.

Your visitor from out of town need not disturb himself unduly as to whether Fifth Avenue and Broadway bifurcate at 14th, 23rd, or 34th Streets, until after he gets here. Then is the time for him to worry about such details!

By painstaking efforts, evidence has been gathered which demonstrates to us unanimously and in an unmistakable manner, that man is a product of Organic Evolution. We feel, then, like your lately-arrived visitor, that we have reached the big city. Give us time and we will become acquainted with the lay-out of the streets!

To-night an interpretation of the evidence as to where the human stock originated has been presented by our speaker, Professor Osborn, whom all of us esteem most highly. He has manifested an admirable quality of sportsmanship and fair-mindedness, in inviting some of us whom he knew to hold views differing from his own, to hear and discuss his talk. Such a diversity of views is usually the result of different lines of approach to the study of a problem; and the exchange of different interpretations should prove helpful and constructive rather than disturbing.

Since several viewpoints are being offered here, I would like briefly to give a somewhat graphic idea of the aspect from which I have approached the problem of Human Origin—that of Comparative Anatomy. For example, let us use three points: The first point (at the bottom of our blackboard) represents the earliest phase of primate life, occurring near the beginning of the Eocene period. This upper point 2 (to your right) represents modern anthropoid development. And point 3 (on the upper left side) represents the modern physical structures of mankind.

Because the living great apes have been derived from the primitive tarsiod forms represented by point 1, a line connecting points 1 and 2 may be used to indicate the course of anthropoid evolution. A similar contact must be made between points 1 and 3, as man also is a primate derived from the same

root; but here the question arises—Does this second line connect these points directly, or does it converge upon our first line? If the latter is the case, then how far after the first line (anthropoid) has departed from the original point 1, does it form the fork branching to point 3 (man)?

When we compare the body-structures of modern man with those of the very primitive tarsiod, a very wide range of anatomical differences is to be observed. The ancient tarsiod was a small quadruped; man is an upright biped. Consequently many changes were necessary in order to create man, and those changes extend throughout the entire body. They include changes throughout the skull and a change in the relationship of the head to the spinal column. (The lower jaw of a quadruped is carried practically on a line with the direction of the spine, both being horizontal.) Also there is a change in the ordinary movements of the neck. In the quadruped the head swings to the right or left upon the neck, while in man the head moves by a rotation of the neck.

Man has decidedly longer arms than the primitive quadrupedal tarsiod. We find also very marked changes in the shoulder joints. The shoulder joints of a quadruped are more or less restricted to a single plane of movement in the direction of locomotion, while man has the ability to move the arm in all directions—circumduction. There is a notable lateral widening of the chest in man, the inclusion of a rudimentary tail in the floor of the pelvis, and a readjustment of all the visceral structures—changes which are definite and specific rearrangements for the erect posture.

The legs of man have been changed to extend in a direction continuous with that of the spine, instead of being at right angles to it as in the quadrupeds. The human foot is far different from that of the early tarsiod.

If we analyze these many differences and their nature, we will recognize that to a large degree they are identical with the characteristic changes by which the body structure of the great apes has also become differentiated from that of the distantly ancestral tarsiods. In observing the various habits of animal life—and here is an example of how comparative anatomy and

natural history are combined in these studies—we note a locomotive habit peculiar to the anthropoid apes—they move about in the trees by means of the arms as a man swings on a trapeze or traveling-rings in a gymnasium. Such a habit (brachiation) if adopted by a quadruped, would alter completely the body posture of the animal. Moreover, it would have specific influence to encourage and to stimulate the entire range of changes for a vertical position of the body, such as characterizes both the human and the anthropoid groups. Arboreal brachiation imposes a transfer of the function of locomotion from all four of the legs to the upper extremities only, with a subsequent increased development and greater mobility of the shoulders, longer and more powerful arms; and the legs would tend to become extended in line with the vertical body through the unrelenting influence of gravity. In fact, it is in the altered relationship of the body structures with the downward pull of gravity (as effected by the horizontal or the vertical position of the animal) that we can find a uniformly constant explanatory basis for the structural differences, especially of a mechanical nature, which man and the apes hold in common to the primitive quadrupedal tarsoid.

The grasping foot of the great apes traces back to the type of foot which we assign to the early primates and to the lower modern forms, without any obstacles to that conclusion. The foot of man, however, has not come directly from such a source, for analysis has demonstrated in no uncertain manner, that the human foot could only have been evolved from a grasping anthropoid model.

In considering the teeth, we are dealing with evidence of utmost importance in my opinion, because this phase is supplied with actual fossil material. Professor Gregory has shown in his extensive studies, that the Miocene ancestors of the great apes possessed a tooth pattern which, while far removed from that of the ancient tarsiods, stands midway between the dentition of the anthropoids on one side, and of man on the other. Hence, in the tooth structure of the Miocene apes—a group I prefer to regard as “proanthropoids”—we have evidence that apparently furnishes us with an actual point of contact or union between the ancestral human and great ape stems.

Prof. Tilney has emphasized the importance of "arboreal brachiation" as a necessary phenomenon in the evolution of the human brain. It was also the outstanding factor in altering the ancient quadrupedal primate to the point where, by the adoption of ground-living habits, its body was prepared to begin assuming the distinctive physical characteristics of mankind. In other words, a long, protracted period of brachiating habits in the trees was required to modify and establish the body structures and nervous system of the primitive quadruped for the upright posture, and to extend the legs below a vertical spine. When this had been accomplished to a sufficient degree, the prehuman stock descended to the ground as erect bipeds with a gait probably not unlike that of the modern gibbon. In that adoption of ground-living habits, the function of locomotion became completely transferred from the upper extremities upon the legs with the subsequent increase in their size and development which we now see in man. The other groups remaining in the trees as ancestors of the living apes, continued to acquire greater and more exaggerated arm proportions, lengthened and hook-like fingers, and a notable reduction in the size of the thumbs. Man's relative arm-length may be regarded as representing the stage of arm development attained when his original ancestors began their life on the ground.

As we review our comparison of the body structure of man, of the anthropoids, and of the primitive quadrupedal tarsiod, it becomes strikingly obvious that in retracing human anatomical characters, we find them converging—not upon the little tarsiod form—but upon some point in the line of anthropoid evolution. Hence, the problem of where the point of origin of the human stock is to be located, seems to resolve itself into two questions,—1. How long were tree-living habits maintained by the evolutionary line leading to mankind before its representatives turned to life upon the ground? 2. Was the early arboreal existence of the prehuman stem separate from that of the ancient anthropoid stock as an example of similar habits with parallel development; or were the two lines represented in a single ancestral stock—and if so, for how long?

Answer to Question 1: The degree (estimated quantitatively) in which man's anatomical structures have departed from those

of the primitive tarsiod by adaptations for the vertical carriage of the body, and the degree in which they concur with similar changes observable in the bodies of the apes, indicate 1,—that the prehuman period of arboreal existence must have reached fully half of the chronological distance from the beginning of primate life to the present time; and 2,—that the peculiarly human physical characteristics of mankind are essentially terrestrial adaptations for bipedism which have been superimposed upon, and have modified the distinctive arboreal characteristics that had been attained to a relatively high degree both by the ancestors of man and by the ancestors of the modern anthropoid apes.

Answer to Question 2: That the prehuman period of arboreal existence with its associated adaptations for an arboreal erect posture (brachiation) is to be represented in a single or common ancestry with the great apes, is strongly testified to by the following evidence:

1. The intermediate position of the Miocene apes' dental pattern which has been retained to a definite degree by living anthropoids, and is also recognizable in the tooth structure of fossil man.

2. The similarity of brain organization in human beings and in the anthropoid apes.

3. The fact that the human foot could only have been evolved from a distinctly great ape grasping type of foot.

4. Physiological blood tests, which demonstrate the exclusively close relationship of man and the apes, as compared with the remote relationship man holds with all other primates upon the basis of similar tests.

5. The absence of any basic anatomical or physiological differences which would affirm the early separation of the human and anthropoid lines of ancestry.

Combining all the reasons just given, it seems most logical to conclude: a) That the human stock originated from "proanthropoid" ancestors at some point within the early half of the Miocene period; b) that the separation of the two stocks occurred when as erect bipeds, the earliest representatives of the human stem began their life on the ground; and finally, that the

actual development of a recognizably human body form (through terrestrial modifications of the original proanthropoid structures) could hardly have been effected until far into the long Pliocene period which followed.

PROFESSOR J. H. MCGREGOR: Many years ago the great zoologist Huxley said that the question of questions in interest to mankind was the problem of human origin and man's place in nature. I have always felt very sympathetic toward this view and for many years have been particularly interested in this question, especially the relationship of man to the anthropoid apes and other primates.

Like Professor Gregory, I am glad to acknowledge my great indebtedness to the excellent training in zoology which I had under Dr. Osborn many years ago. Much as I admire Professor Osborn and in agreement with him as I am on most zoological questions, I am unable to follow him in deriving man and the living anthropoid apes from separate stocks which diverged earlier than the earliest fossil anthropoids. The evidence from comparative anatomy, paleontology, embryology, biochemistry and even comparative psychology, indicates beyond any doubt, to my mind, that man and the modern anthropoids are extremely closely related, and that their latest common ancestors must have been real primitive anthropoids, or as Dr. Morton has suggested this evening, perhaps a better name would be pro-anthropoids. This ancestral branch, destined to divide later into modern apes and men, certainly separated from the monkey stock long before it split into the modern anthropoid and human groups.

Professor Osborn, in his lantern slides of embryos and adult apes and men, called attention to the fact that man had not gone through any of those long-armed stages. None of us believes that man came from any of these modern anthropoids, certainly not from gorilla, chimpanzee, orang or gibbon, but in the opinion of most of us who have made a specialty of the subject, man arose from a common ancestor, probably in early

Miocene or Oligocene time, which was not so greatly specialized as the gibbon and orang for arboreal life. The enormously long arms and hands of these creatures represent a secondary adaptation to tree life just as in man the longer legs and shorter arms are adaptations to terrestrial habits. The common proanthropoid ancestor probably had the fore and hind limbs more evenly balanced.

One thing which ought to be clearly realized is that the great line of zoological cleavage is not the separation of apes from man, but the cleft between anthropoid apes and man as one single group and the tailed monkeys as another group. The difference between the chimpanzee and the tailed monkey is far greater in every point of zoological importance than the difference between chimpanzee and man. This is not a new idea. It was very clearly elucidated by Huxley, by Haeckel and especially in more recent years by Sir Arthur Keith, but it was first brought out 228 years ago, in 1699, by the English anatomist Edward Tyson, the first man who ever dissected an anthropoid ape. As the conclusion of that real classic in anatomy, Tyson gave a list of the features in which the chimpanzee resembles man more than monkeys and another list of the features in which it is more monkey-like. He listed 48 of the former and only 33 of the latter. However, mere figures here do not mean much for, as Chalmers Mitchell has said, "Characters have to be weighed as well as counted." But since Tyson's day an enormous mass of evidence has accumulated in support of his conclusion.

The recent studies of the mentality of the chimpanzee by Koehler and also by Yerkes indicate that these animals are essentially man-like in the mode or method of their mental operations, though in content or range their minds are more like those of monkeys or other higher mammals. As Koehler says, "Chimpanzees behave in a way which counts as specifically human." Perhaps we may say in brief that the chimpanzee's mentality is qualitatively human but quantitatively that of a brute.

There are many other points which I should like to discuss in connection with anthropoid-human relationships but in view of the lateness of the hour I will close.

January 20, 1928

THE LIFE AND WORK OF
GEORGE S. HUNTINGTON *

(ABSTRACT)

C. F. W. McCURE

Tonight there are gathered here the colleagues and friends of the late George Sumner Huntington, to do honor to him whom all of us admire and respect for his works, to whom many of us are held by the strongest and closest bonds. Posterity knows a man through his accomplishments; his personality lives only in the memory of those with whom during his life time he has intimately associated. It would seem proper that in this company I should dwell more on the man, on his great and compelling personality.

My acquaintance with Huntington dates back to 1890 when I was a student of his in the College of Physicians and Surgeons. It was not until the autumn of 1903, however, that I was brought into close working association with him. At this time both he and I were actively developing our respective collections in comparative anatomy; through our community of interest in these there grew the close friendship and professional relationship that existed between us to the end of his life. Very soon we were deeply engaged in joint investigations on two problems of the vascular system. It is because we worked so closely on these through a period of twenty odd years, collaborating in the publication of work carried on both together and independently, that I was so intimately acquainted with him professionally and personally, and so asked to address you this evening.

Huntington began life as a professional anatomist at the time when in this country anatomy was merely an adjunct to surgery; he died as one who had played a leading and dominant role in raising anatomy to the high status it now has in America—that of an independent science.

With the exception of six years spent in the German Gymnasium, Huntington obtained his education, both college and

*On account of the length of this paper, it is impracticable to publish it in full.

professional, in this country. The influence of the years in Germany is most evident throughout his life, *e.g.*, exactness and attention to detail, his love of the classics, his broad culture and the beginning of his collection of books on anatomy.

At Trinity College, Hartford, where he was a member of the class of 1881, his ever increasing number of electives in chemistry, botany and zoology indicates that he had determined to adopt a scientific career. There he received honors in mental, moral and political philosophy, in chemistry and in the natural sciences, ranking seventh in a class of nineteen. In 1884 he graduated from the College of Physicians and Surgeons, ranking second in the class of one hundred and twenty-five, and won first prize of \$500 in competitive examination. At the same time he won the prize for the best clinical reports at the New York Hospital.

After graduation he entered Roosevelt Hospital, remaining until 1886, when he became assistant demonstrator of anatomy in the College, continuing until 1889, at the same time assisting Doctor H. B. Sands in his private practice. He was visiting surgeon to Bellevue, junior assisting surgeon to Roosevelt, and chief of the surgical clinic at Vanderbilt.

In May, 1889, he was appointed Professor of Anatomy and was the first man in a medical school in this country to give his full time to its teaching and to the investigation of anatomical problems; also to teaching by demonstration to small sections of the class.

Being a close student of evolution and deeply influenced by Darwin, Huxley, Owen and Gegenbaur, he now adopted morphology as a means of interpreting the structure of the human body, giving importance to comparative anatomy, and so vitalizing the whole subject. Thus he made clear the fact that the multitudinous detail which the treatment of man offers can be interpreted from the standpoint of the morphology of the different organ systems, and in relation to the application of structure to function. The significance and importance of the structural peculiarities of man he accentuated and illustrated by comparison with the morphology of corresponding structures in the lower vertebrates, and thus unrelated detail was replaced in 1889 by a lecture on a much higher plane. The

number of vertebrates that he personally examined, dissected and prepared, is almost unbelievable. As a comparative anatomist no one in America has ever equalled him either in practical experience or in the extent of information. He developed a definite plan leading to the establishment of what he hoped would be a permanent museum of comparative anatomy. Such a plan was formulated by him and published in *Science* in 1901 under the title "The Morphological Museum as an Educational Factor in the University System."

The Huntington collection of nearly six thousand mounted exhibits, practically prepared and mounted by himself, together with a large amount of material classified and catalogued, but still to be prepared, is the most extensive and complete in this country and unexcelled by any. Such a museum would rank with the Hunterian Museum of Comparative and Human Anatomy in the Royal College of Surgeons in London.

Dr. Huntington has left forty-five publications which were written between 1892 and 1920; several unfinished manuscripts; an unpublished history of anatomy and medicine. These publications cover a wide range in the field of vertebrate morphology and include investigations on the comparative anatomy and development of the digestive, genito-urinary, respiratory, nervous, muscular, lymphatic and cardio-vascular systems. Seven papers on the development of the vena cava and of the lymphatic system were published jointly with me between 1903 and 1920. His "Anatomy of the Human Peritoneum and Abdominal Cavity" appeared in 1903, and is profusely illustrated by five hundred and eighty-two figures, the greater number of which are drawn or photographed from his own dissections.

Variations in anatomical configuration as observed, especially in different mammals of the same species, were always of great interest to Huntington. He published five papers on the subject between 1895 and 1904 on variations of the muscular system in the lower primates and in man; in other papers he shows that variations in the genito-urinary tract can be interpreted by certain definite and recognized modifications possible in the embryonic ground plan of this tract in mammals. Other papers were on the comparative anatomy and development of the mammalian respiratory organs. For these he made nearly

five hundred wax corrosions of the lungs of mammals and of other vertebrates. A monograph, still unpublished, is the most extensive and complete exposition of the subject in existence. and must long remain a standard authority.

In 1906 Huntington and I read a paper before the American Association of Anatomists, in which we claimed that the main lymphatic vessels of the embryonic cat do not develop from the endothelium of the veins as maintained by Sabin, but develop *in loco* independently of venous-endothelium from embryonic mesenchyme. After an active controversy of about fifteen years the theory of the local origin of intraembryonic endothelium from mesenchyme is now generally accepted by anatomists, even by those who at one time most strenuously opposed our view.

Huntington's unusual and striking personality was a dominant factor in his power as a teacher and contributed greatly to his professional success. His sense of humor, gracious manner, ready sympathy, keen insight, and broad culture won him friends wherever he went. Everyone was impressed with his vitality, alertness and pugnacity. All his activities were characterized by an enormous vigor. When a young man, his daily exercise was taken with a professional wrestler. He was an incomparable woodsman and hunter. On camping trips in Canada he went without guides, preferring to do the hard work himself.

In the laboratory he showed the same indomitable qualities, working incessantly and loving his work, oblivious and insensitive to everything but the idea he was pursuing. In the height of our investigations he would often discuss with me in the evenings, over the long distance telephone, the results that the day's work had brought.

At home his hospitality had a charm. Discussions there took on a new angle. He would comment on the broad aspects of our work, he would laugh over humorous events of the day, he would sketch plans for the future.

I know of no teacher more solicitous for the success of his students or who did more to further their interests. He was surrounded by a brilliant group of young men, and between

the years 1895 and 1919, thirty-nine investigations were published from his laboratory, not including those he himself wrote. Some of the most prominent medical men in the country owe to George Huntington much of the impulse and ambition that has brought them their professional success. At the meetings of the Anatomical Association he invariably played a leading role, taking part in nearly every discussion. He was a valuable consulting surgeon, always alert to the practical significance of his anatomical work, and as an anatomist he never lost sight of the fact that the training of surgeons was one of his chief aims. The combination of a professional anatomist of highest standing with a surgeon of rare skill is unique; in these days of high specialization it is not likely to occur soon again.

Those of us who were Huntington's intimate friends will always regard him as highly for what he was, as for what he accomplished. His charm of manner, his humor, his deep loyalty to friendships, his masterful energy, his whole dominant personality we shall not forget. He was a rare man, a remarkable friend.

DISCUSSION

FREDERICK TILNEY: In many fitting tributes Dr. George Sumner Huntington has already been given his true proportions as a scientific figure, as a man of history, as a great American.

By contrast, what I have to say will seem meagre, for it is merely the recollections of one of his pupils, fragmentary recollections of many intimate and delightful relations growing out of associations with him in his laboratory—really impressions of him made by the contacts of his daily life upon those who served and honored and loved him.

If one could imagine the dingiest and most dusty loft-like room in New York, extending two stories up from 59th Street almost all the way through to 60th Street, filled with tables and shelves, cabinets and stands, all bearing a weird variety of unusual objects; if one could summon the visual powers sufficient to pierce a dense haze of tobacco smoke and a mist of steam rising from many bubbling kettles of mysterious injection material; if one could withstand the assault of an atmosphere

reeking with formalin and bearing the malodorous effluvia of some erstwhile denizen of the Zoological Gardens—perhaps a lion, or a bear, or an elephant (and most particularly an elephant) or a camel—come at length to be made immortal by the skillful hands and treatment of a great master anatomist; if one could sense all of this, then it might be possible to have some slight conception of the laboratory in which he lived and worked and wrought valiantly for science.

It was into this room that I first came, hat in hand and humble, one sultry October afternoon many years ago. I came earnestly seeking more knowledge from a source where I knew it was to be obtained. All of the things about this room which have just been mentioned struck me at once. Still more impressive, however, was the deep silence which pervaded the place. This silence was as strange as everything else in the room. It produced a most unusual effect. It seemed mysteriously dynamic and intensively concentrated. It was not the silence of dead and inanimate things, but an almost breathless interest, vivid and vital, seeking and finding revelation in the forms of organic matter. Off in one corner was Mr. Martin Peterson, the artist, silently making some of those famous drawings which have illustrated the Professor's researches. Across the room Mr. John Morris, the technician, toiled in silence in the preparation of that unparalleled embryonic collection which has offered the material for some important investigations. In a far corner a preparator worked upon the museum casings of models, while six or seven students at their various places were silently engaged in their several problems.

The fountain head of all this silence sat at his customary table in the dingy light of the old north window. I can well remember—for it seems but as yesterday—my first words with him. Instantly he made an indelible impression upon me, and I felt as if by some prescience that I had come under the spell of a compelling personality which would always hold me. As the years have passed, that spell has changed only to grow stronger and to create the enduring hope that its influence may never fail.

Somewhat hesitatingly, I expressed my purpose in coming to him, my earnest desire to study the brain. He did not warm immediately or much to this project, but asked me rather if I

might wish to pursue some cognate subject. My limited understanding of the subtleties in morphological expression left me wondering what a cognate subject might be. Up to this time I had never encountered this kind of a subject. Apparently my answer was not the correct one. I assured him I had no leaning whatever to cognate subjects and he, on his part, promptly directed me to another department of the school where, perhaps, they could give me something on the brain. I left him reluctantly with the result that I spent an entire year elsewhere which I might have had under his tutelage.

But I never ceased to think of him, and when the year was over I returned to the same laboratory to find it in its same dinginess and silence. This time I was more fortunate. A classmate of mine at New Haven, now the Dean of the Medical School, interceded for me with the Professor, especially when I had given the assurance that I was quite willing and eager to take up a cognate or any other kind of subject that might give me opportunity to work with him. And thus began a long apprenticeship extending over a number of years in which mere academic associations grew ultimately to devotion and friendship.

Favorable as this new start in the laboratory seemed to be, it was not without its harsh disappointments. He provided me with table, embryonic preparations, microscopes, camera lucida all in readiness, as I thought, for a wonderful new opportunity to study the brain. But what was my utmost amazement when he informed me that the task I had been assigned was to work out the development of the genito-urinary system in the domestic cat—a long, long way from the brain, and a long (I trust, uncomplaining) two years of effort.

Nothing impressed me more in this time than his peculiar method of teaching. This was as singular as it was individualistic, and quite as distinctive as the atmosphere of his laboratory. If there was one thing that distinguished the instruction which he gave me, it was its superb detachment, its masterly distance. Days went by, weeks passed, and further than the formal daily salutation, he never spoke to me or gave me the slightest attention. My problems grew and perplexed me. Yet, rather than disturb his intense preoccupation, I preferred to

slip into his library, to toil laboriously over questions which he might have answered in a moment. To my sensitive way of thinking, this seemed something like real neglect, but day by day, almost without my knowing it, he was teaching me in a language more eloquent than words. I had but to look over my shoulder to see him there at his table in the corner, working morning, noon and evening, weekdays and often Sundays and holidays, from one session to the next. It was by this irresistible and immortal example that he had stamped the greatest lessons of science and life upon several generations of physicians who came passing up the old stairway in the College of Physicians and Surgeons and saw him there at his task as I saw him intent upon his labors, oblivious to all else but the subject of his immediate study.

Then came a day, a rare day indeed, when he sat beside me for nearly a whole morning. After he had gone I felt inspired anew. I was conscious of a fresh zeal and determination, with something like a glow of enthusiasm even for the, to me, distantly related genito-urinary system of the domestic cat. Consciously or unconsciously, he had given me a new idea about teaching. He had clearly shown what is all too little understood by those who have the responsibility of medical instruction. Obviously, the chief purpose here is to inspire the student with the desire to learn, to provide every opportunity for such learning, and to eliminate in so far as possible all of the processes of formal indoctrination. For the real joy of learning comes of that sense of independent acquisition, that realization of possessing a self-gained knowledge. This most effective teaching was not by words but by work. That superb detachment already mentioned he carried into his formal instruction and lecturing as well. He spread before his students a feast fit for the gods and it was no fault of his when perchance the gods had gone a-hunting in other fields than medicine, and none but minor deities came to his table. These considerations affected him not at all. Regardless of his auditors, he set forth in that splendid diction of which he was a master, the full content of his facts in all their details and relations. Each one of his lectures was prepared with meticulous care. The morning hours before them were spent in his library in concentrated

study of the subject he was to present and all of the drawings employed to illustrate his points, he practiced beforehand in fullest detail.

I have the blackboard reproductions in color of two of the drawings with which he illustrated his last lecture—treasured mementoes of his painstaking efforts.

This determination to present his subject, not down to the level of the student, but up to the full value of the problems in question, was a recognized feature in the high quality of his teaching.

If there is one criticism of American medical education to-day more valid than others, it is that our pedagogy has not risen much above the medical high school level. Dr. Huntington was one of the few medical teachers who entirely transcended this level. He may have recognized the necessity of practical, merchandizable learning, but he cherished and looked with greatest favor upon the highest ideals of true scholarship.

In addition to his enormous capacity for work, he was versatile both as a classical scholar and linguist. As collector of rare and old books, particularly anatomical works, he manifested a zeal in keeping with his many-sided versatility. He was also a student of invertebrate zoology and botany, and his collections in these branches of science may well enough have brought him sufficient distinction were they not surpassed by his morphological collection. This latter, the personal work of his own hands, equals, if it does not overshadow, any similar collection in existence today. Added to these capacities was a prodigious memory made invaluable by a most voluminous scientific reading. This was of inestimable service to himself as well as to the members of his staff, for he could with the greatest of ease give references to former work along a great number of research lines.

His laboratory was an American Mecca of anatomy. It would be impossible to give the entire list of his distinguished visitors from all over the world. Few scientists interested in this field of inquiry left New York without coming to see him. Whenever we heard the old elevator door slam with unusual abandon, we knew that the beloved Spot McClure had arrived from

Princeton. Those were gala days. Professor McClure and Professor Huntington had formed a scientific alliance by means of which they gained many notable victories in revealing the true nature of the lymphatic system. The days of Dr. McClure's visits with us were always feverish ones. The entire research work of the previous month or so was carefully reviewed and enthusiastically discussed by the two leaders. Then the desk of each worker was visited and the progress carefully criticised. We learned all the news from the battlefield of the great lymphatic war. We heard how the enemy at Johns Hopkins had outflanked us by injecting India ink into the jugular lymph sac. This ominous information left us almost in panic, but it was nothing compared with the bulletin that our adversaries at Cambridge had stolen a march on us by ligating the omphalomesenteric vessels. In consequence of this we felt ourselves thoroughly routed and almost in despair. But before leaving us Professor McClure would develop some degree of optimism about our efforts, and our own Professor calmed our troubled spirits with the assurance that this was only Spot's way of making us all work a little harder and thus assure our ultimate victory.

Once Sir Arthur Keith spent two days in the laboratory which gave us an opportunity of hearing these two world-famous authorities discuss their studies in human evolution and filled us again with new appreciation for the morphological masterpieces which Dr. Huntington had created.

The great Waldeyer also visited the laboratory, and was lost in admiration at the marvels of that anatomical collection which must at length take its place among the real treasures of human achievement. The old German scholar took pains to let us know how fortunate we young men were to be working under the direction of the greatest morphologist then living in the world. We were gratified to know that Waldeyer had recognized this fact; as for us, we had been very sure of it this long time.

There was another distinguished visitor who came to see us more often. We could always tell when he was there because

he made the rafters—or whatever held up the ceiling—reverberate with loud and prolonged laughter. In fact, he was the only one who ever effectually shattered the dignified silence of our laboratory. More than this, he infected our Chief with his boisterous merriment and the two laughed loudly together. This other honored visitor, then the Dean of those happy days, is none other than the present distinguished President of this Academy of Medicine, Dr. Samuel Lambert. For us it was a revelation to see these two great men descend from their high places and before our eyes become Damon and Pythias again as they had been in their earlier medical days, to reveal that strong and binding friendship which had carried them through many years of arduous labor together; which had kept them shoulder to shoulder through all the activities of a strenuous faculty life, which persisted deep and unchanged to the end. It was that quality and capacity for friendship which drew to Dr. Huntington the large group of physicians and surgeons who made New York medical history in the past quarter of a century. It was this friendship also which held the anatomical department together, and he, as its guiding spirit, was the most unfailing of friends.

Presently, probably within the next few weeks, the Department of Anatomy will move up-town to its magnificent new quarters in the Medical Center. Perhaps it is even well that he is not here to go with it. This new mantle of splendor might have palled upon his true simplicity.

They tell me that the old laboratory is now vastly changed. I cannot bear to set my foot in it ever again. For me a new silence is there now, the real silence of departure and of death. And yet that old room with its dusty equipments, those old times and those old affections, are stamped upon the memories of many of us as the golden days of life. Surely *amor vincit omnia*, and his presence has not passed while we yet live. We shall always see him sitting at his table in the dingy light of the old north window, working as in a glory, still inspiring all our efforts to be worthy of him, our great master, our beloved benefactor.

SAMUEL W. LAMBERT: I first met George S. Huntington in the fall of 1882 when as medical students we were in the College of Physicians and Surgeons. He was one year ahead of me but we went along similar lines and saw much of each other, both in the office of our preceptor, Dr. Henry B. Sands, and in the dissecting room. We both believed we were started on a surgical career. In 1882, medical instruction at the College was given entirely by lectures, either theoretical or clinical. Evidence of attendance was given only by the purchase of cards for the theoretical lectures and for anatomical material. George Huntington bought his real education, like the rest of us, outside or inside the College walls, by paying the younger hospital, dispensary and laboratory physicians for private courses.

Dr. Huntington had been educated in part in Europe and had a fluent command of French and German and a greater facility with Latin and Greek than most College graduates of his day. He had a body that knew no fatigue and a mind that took in every branch of medicine. During his second year he was the personal assistant of Dr. Sands, did the microscopic work of private patients, assisted at operations or gave ether for that leading surgeon of New York. He was prosector for Dr. Sabine, the professor of Anatomy, and was taking private courses in pathology, in physical diagnosis, in the quiz class of Dr. Richard J. Hall and read medical science enough hours to occupy him from sixteen to eighteen hours a day.

Dr. Huntington was an interne on the surgical staff of Roosevelt Hospital. On leaving the hospital he was made a demonstrator of anatomy at the College, conducted a quiz class for Dr. Sands, for whom he became an assistant, both in private work and as assistant attending surgeon to Roosevelt Hospital. In 1889, at the age of twenty-eight, he was made lecturer and one year later, Professor of Anatomy. His surgical career, which had promised much, was cut short before it really began, and he found his life work in the fundamental medical science of Anatomy.

During thirty-five years he worked in embryology, in comparative anatomy, and in human anatomy and built up a collection of specimens which is so varied, so complete, so full of unusual examples that no other institution possesses anything like it. As an investigator he left the beaten track of his predecessors and his contemporaries and added to comparative anatomy an exact knowledge of the internal organs of the vertebrates, a subject which had previously been neglected by every anatomist. He was always a fulltime man in that he worked in term time and in vacation, in his college laboratory and in a hut in the Canadian woods, he labored seven days a week and was at his dissecting table from eight in the morning until seven in the evening, and his evenings were given to reading. He was a full time professor, not because he devoted himself only to his professional work, but because his work in lecture room, in seminar, in the dissecting room with undergraduate students and with his museum, laboratory and his books, filled every hour of his waking time. He wrote scientific monographs on his special pieces of investigation, which left nothing further to be added by others. He left unfinished a study of the comparative anatomy of the lungs which is as thorough as his best previous work and which was still growing when his final premature breakdown came at the age of sixty-two. At the same time he had begun a study into historical medicine in which he emphasized the content and human interest of the text of some of the books of the 16th century, which are usually regarded purely as collections of anatomical drawings of academic interest alone.

George Huntington was a born collector who studied his collections for their own value; he was not a mere acquirer. Early in life he collected beetles and butterflies, and was no mean authority on the coleoptera. When a student in Germany and while at Trinity in Hartford, he collected early editions of the classical authors, especially the smaller editions in Greek and Latin of Elzevir and Aldus. As a young surgeon he collected the files of the journals containing the record of the development of the science of surgery which followed the epoch-making work of Lister. When he gave up surgery he presented his surgical collection to the library of the Lying-in Hospital, in

which I was then most interested. His collection of books on anatomy is grouped about Vesalius as the central figure and is particularly strong in the publications of the 16th and 17th centuries. It forms almost a complete history of the renaissance of anatomy following the revolt from the Galenical traditions of fourteen centuries.

His most active work as a collector was put forth in gathering together the dead bodies of the lower animals both of rare and ordinary species, from which he built his museum. These dead bodies came from the zoological parks, from the ships in the harbor which were importing animals for the menageries of the Hagenbecks and Barnums, also in special preservative cases from the most distant places of the earth. They arrived in greater numbers than could be handled quickly, and the refrigerators at the College were full to overflowing with vertebrates on cold storage.

No one who was working at the Sloane or Vanderbilt Clinic in 1894 can ever forget the arrival at the College of the camel. This dead beast was delivered at the College Yard at 3 p.m. on Friday, July 2nd. New York was enjoying one of its hot spells. The Hicks family, both Gilbert and Eddie, were gone for the week-end. Not even the Professor was on hand, and the unwelcome camel lay in the sun by day and the heat by night, with the temperature ranging from 80 odd to 96 in the shade, during the holidays of July 3rd, 4th and 5th, Saturday to Monday. The travelers on the elevated road a block away, thought that a terrible epidemic had befallen Roosevelt Hospital, and the whole neighborhood mourned over the death of that particular camel. On Tuesday, the Board of Health came to the rescue and the deceased was promptly buried at sea. On one winter's day, Eddie Hicks, who was not a muscular man, received in a gunny sack a dead South American python, from a ship near the Battery. On the way up town the bag, which was big with a 16 foot snake, was laid next to the steam pipes on the elevated. As Eddie went down 59th Street to the College, the rotten sack gave evidence of active peristalsis, but fortunately, did not burst open until the laboratory was reached. when the boa constrictor was overcome, but not without a long

struggle. He died shortly, a violent death, and his insides adorn the museum. When Jumbo, the pride of London and the triumph of Barnum, died, his skeleton and his hide went to the Museum of Natural History, but his entrails went to the College and his ileo-cæcal junction forms a prominent dried specimen in the Huntington collection. Many other vicissitudes of fortune befell during the collecting of Dr. Huntington's specimens. Professor Huntington's dissections are models of neatness and dexterity and show minute details. His laboratory was a dusty, uncared-for chaos in which the individual specimens formed oases illustrating the scientific accuracy of a genius. His catalogue was in his own head, and he knew what he had and where he had left it, and woe to him who had moved its position.

George Huntington carried the tradition of the College of Physicians and Surgeons as an anatomical school of medicine to the highest point of its development on those lines. He was always a champion for his department and for many years he made it the central feature of every change in the curriculum. When he first began his work, the department of anatomy was the only spot in the College of Physicians and Surgeons where the undergraduate of medicine could get personal experience of the practical art and the science of a medical specialty. As time passed Professor Huntington saw other departments develop along similar lines and take on new life and vigor, but none of them diminished the educational tender of his department. Most of the graduates from the College, who have become prominent surgeons in this and other cities, have served their apprenticeship as undergraduate prosectors and as post-graduate demonstrators under George S., and the surgical work of Bellevue, New York, St. Luke's, Presbyterian, Roosevelt and many other hospitals now feel his influence to their great and lasting benefit. George Huntington left open for all students the gate to success in anatomical study, but he took no interest in the laggard or the dull-witted, and he chose his favorites on his own estimate of each man's ability alone. His professional life was that of an intellectual enthusiast, devoted to an ideal to make of it all that he could in the pursuit of his controlling goddess, the science of anatomy and with him life was always

short and art long. He exemplifies in his scientific career the philosophy of Francis Quarles:

"What has thou then, proud flesh and blood, to boast?

"Thy days are evil, at best; but few, at most;

"But sad at merriest; and but weak, at strongest;

"Unsure, at surest; and but short, at longest."

THE DOCTOR LOOKS AT CULTURE

(ABSTRACT)

JOSEPH COLLINS

There are many reasons why a youth studies medicine and chooses it in preference to any other profession, but whatever incentive he has, success is his goal, not only success measured by professional reputation and material prosperity, but by self-realization.

Two elements facilitate self-realization—taking thought and gaining culture. Familiarity with the intellectual activity of the past and present and reflection upon its bearing on our welfare, conduct and lives constitute culture.

It should be part of education, but in reality the relationship between them is distant. A man may be cultured and have small education, Walt Whitman for instance, or may be greatly educated but not necessarily cultured, Robert Burton for example.

Education is to the building of a house what culture is to its decoration. Vocational education equips the mind with the essentials of the trade or profession; culture adorns it with the humanities. Physicians should study living languages and the sciences for many reasons and steep themselves in the humanities for two—to fill their own reservoir of pleasure and to generate energy in their work. By studying physiology and pathology they will gain self-approval; by studying human nature they will gain the approval of others. The sort of culture they need is best obtained by familiarity with poets, philosophers, biographers, thinkers, musicians and art.

It is agreed that the welfare of the soul is enhanced by culture, but that it enhances professional efficiency is not so well recognized.

Culture is obtainable everywhere, in galleries, museums and libraries by preference. Neither Benjamin Franklin nor Thomas Jefferson had been to college; William Osler and William James had not either; yet they were men of great culture. If colleges should teach students to think, college might be the best place to attain culture.

I am convinced that the medical student who knows the great classics of the past is better equipped to practice medicine than he who has Quain, Osler and Howell at his finger tips. Anyone who knows anything thoroughly, be it history or literature, music or sculpture, may achieve a reputation for culture. Arpad Gerster, Walter James, Pearce Bailey and Frank Meres were ideal men of culture.

Culture has a reputation for creating an elite by giving to some advantages that others have not; anyone can attain it so there is no favoritism. It is said to engender idleness by unfitting man for ordinary labor; John Cotton Dana is an example that it does not. It has been objected that by its dealing with the past, it hampers progress; thrilling prowess and civic virtues are never out of date and ancient literature is filled with such examples. And the creation of an elite should be desired and striven for.

Were there any unanimity of opinion about what the duties and even the meaning of medicine are, culture might be given a larger place in the profession. Without basic scientific knowledge it is of little use, but all science is just as ineffectual. Man is the problem to understand when the doctor is confronted with illness and science does not consider man but facts. To draw logical inferences is one of the physician's duties and he cannot do so if he bases himself only on scientific knowledge. A physician may be successful though uncultured, but the majority of immortal physicians were students of matters beyond professional science. If children could develop the habit of reading, and be taught to like it, they would become men of culture as naturally as they become anything they choose to be.

Some physicians of the past have left literary remains that are not to be disdained. Cadwallader Colden, Benjamin Rush, Samuel Bard, Elihu Smith, David Hosack, John W. Francis, William Gibson, James Jackson, Daniel Drake, Elisha Bartlett, Samuel Gross, Oliver Wendell Holmes, Henry Bigelow achieved self-realization and culture.

William Osler and Weir Mitchell are shining examples of the beauty of great culture in the physician's mental luggage. Anyone who is disposed to doubt that the physicians who wrote their names indelibly on the scroll of life were men devoted to the humanities has only to read Benjamin Ward Richardson's "Disciples of Esculapius" to have his doubts removed. And Charles Richet's little book "Le Savant" shows how delightful it must be to be both a great physician and a man of culture.

The student in medicine is not getting a square deal. Most of the work he has to do is dull and dreary and wholly concerned with technical acquisition. His medical education should be made attractive.

My suggestion to remedy the failure of colleges to provide students with general culture is this:

No professor shall be a member of any Medical Faculty who has not stood, or cannot stand, a verbal examination in Medical History conducted by a Committee made up of learned professional men, that is, by men of learning beyond their profession. Candidates for professorship of histology, for instance, should be familiar with the life of Anthony Leewenhock. For physiology should talk entertainingly and instructively of Cesalpinus, Harvey, Joseph Priestly and Stephen Hale. For anatomy should know Mondinus, Vesalius, Fallopius, Eustachius and Sylvius thoroughly. The candidate for bacteriology should spread good knowledge of Spallanzani, Pasteur, Koch, Roux, Behring, Reed and Ross. How an examiner with sadistic streaks would exult should the opportunity come to him to examine some professors of what was once called the Theory and Practice of Medicine as to what they knew of Brown, of Cullen, of Meade, of Radcliffe, Black, Heberden, Haller, Werlhof, Broussais, Louis and so many others! Quacks should be known also: Paracelsus and Mesmer, Perkins and Greentrakes.

A Faculty made up of men who had passed such examination could make their teachings engaging and inspiring and whet the appetites of their pupils for further historical and cultural pabulum.

When I began to devote my energies largely to Neurology, I still kept a general medical service in the hospital and several times served as examiner of candidates for the House Staff. The reputation which I shared with all neurologists of being "more or less crazy" was enhanced, I fancy, by a few questions in the oral examination to general education than technical education, questions that tested the emotional reactions. If a man told me correctly who the steam engine, and how he came to do it, and then in further interrogation of some of the benefits that had resulted from it told me that by means of it fat men were able to glide to Coney Island in a quarter of the time it took a hundred years ago, I gave him a perfect mark, because it suggested to me that he had a sense of playfulness and a sense of humor. If he knew about the Dutchman who discovered in Java the skull of *Pithecanthropus* that was thought to be the link missing between man and monkey, but expressed some doubt of the validity of the claims that were made for it, I felt that association with him for eighteen months would be beneficial, skepticism being such a desirable possession for any physician to have.

If he intimated that one of his reasons for being satisfied with our alleged Simian ancestry was that further investigation might reveal a far less desirable one—the snake, or the shrimp for instance, I implored him to join us.

The difficulty is to get at the student. He is sometimes ignorant himself of the essentials of his vocation. They are character, culture, commiseration and courage; for the physician must eventually treat the ills of the world and to do so successfully he needs all of these qualities. Not only must he develop his personality but he must help create a body of public opinion whose momentum will wipe out our self-consciousness, crush our prejudices, destroy our self-righteousness and purge us of a natural sin: subordinating the universal to the individual.

*Combined Meeting of the Section of Medicine, and the
American Dietetic Association, January 17, 1928*

THE CONTROL OF PROTEIN IN THE DIET*

(ABSTRACT)

EUGENE F. DU BOIS

There has been a tendency for clinicians and dietetians to use low protein diets indiscriminately but in the last few years there are evidences of a trend towards an increase in the protein ration. In all work on dietetics we must remember the fact that the profession has changed its attitude many times in regard to the standard dietary in different diseases. Diabetes is the best example of this.

It is possible to construct a metabolism map in the form of a triangle with fat at one corner, carbohydrate at another and protein at the third. On such a map we can place the standard dietaries used by different races and also observe the possible positions of the experimental subjects following the ingestion of test meals. One of the most interesting portions of such a diagram is that which represents nitrogen minimum, "the wear and tear" quota. In normal subjects the nitrogen excretion can be reduced to 2-3 grams a day and one man has reached the low level of 1.58 grams. We must give larger amounts than this, 6-7 grams of nitrogen a day in order to maintain nitrogen equilibrium. This represents 40-45 grams of protein a day, a figure which is about one-third the ordinary dietary standards.

Much experimental work has been done on animals with very high protein diets. Some of the earlier studies indicated that a high protein diet causes kidney damage. It does cause hypertrophy of the kidney but many investigators have found no evidence of nephritis. Osborne and Mendel obtained normal growth of white rats on a diet containing a very high proportion of protein, some fat and no carbohydrate.

The Eskimos for thousands of years have been living on an almost exclusive meat diet with very high protein content. They seem to enjoy excellent health and a recent survey by Thomas

*From the Russell Sage Institute of Pathology in affiliation with The Second Medical (Cornell) Division of Bellevue Hospital.

shows very little nephritis or hypertension. At one time the Indians of the western plains lived on buffalo and the inhabitants of the South American Pampas also subsisted almost entirely upon meat. Their general condition seems to have been much better than that of the Bengalis on their low protein ration.

The nitrogen metabolism is high in fevers and other toxemias. Some patients with severe diabetes show increased nitrogen metabolism. There is evidence that diabetics get along better on a low protein diet than on a high ration. On the other hand there may be danger in keeping the protein too close to the minimum. Some patients with nephritis show a marked negative nitrogen balance and suffer from protein wastage. Some of these patients can take a relatively high protein ration and retain large quantities of protein to replenish their body tissues.

*Combined Meeting of the Sections of Neurology and
Psychiatry, and Obstetrics and Gynecology,
January 24, 1928*

MERALGIA PARESTHETICA

(ABSTRACT)

JAMES H. HUDDLESON

Meralgia paresthetica, generally considered a syndrome of a certain peripheral nerve alone, may also arise on the basis of a lesion at the level of the cell bodies of the sensory neurone of the second order, as well as more commonly at any level (cell-body or process) of the neurone of the first order. Characteristics of the central pain that may arise from destructive plus irritative lesions of cell-bodies at and about the level of the second lumbar segment, are similar to those of the pain of herpes zoster of the second lumbar root ganglion, sufficiently to warrant considering them both as possible causes of meralgia. Cases of both zoster and of tabes have been reported, showing the syndrome of meralgia paresthetica. Cases of pain with paresthesias, essentially of the same type as those seen in meralgia, and referred peripherally from lesions of syringomyelic type, suggest that the syndrome under consideration may

occasionally arise from a localized syringomyelia or hematomyelia.

The extent of the skin area affected in meralgia is markedly variable. Sometimes it is only that of the gluteal branch of the lateral cutaneous; sometimes that of the anterior crural, genitocrural, or adjacent nerves is involved in addition to or replacing the lateral cutaneous. The latter may be derived from the first or third as well as from the second lumbar root, and there may also be anastomoses distally. A central disease-process could affect a small or large part of the peripheral nerve's distribution.

Peripheral lesions resulting in meralgia paresthetica are widely various—zoster of the ganglion, tumor, pregnancy, obesity, different types of trauma to the nerve trunk at vulnerable points, abdominal or pelvic inflammatory disease, general infections and intoxications.

As symptomatic treatment, if a cause is not found, the following physiotherapy has met with some success: Radiant light and heat to the thigh and leg, followed by massage of the outer side of the thigh; static brush discharge along the course of the lateral cutaneous. More radical measures suggested are X-ray, alcohol-injection, or excision of the nerve.

MERALGIA PARAESTHETICA—A NEW CONCEPTION OF ITS ETIOLOGY AND TREATMENT

BYRON STOOKEY

The etiological factors in the production of meralgia paraesthetica Dr. Stookey believes are an abnormal position and angulation of the external cutaneous nerve as it leaves the pelvis. Angulation and traction upon the nerve at this point is increased by standing and walking as are the symptoms of meralgia paraesthetica. Abnormal angulation with repeated traumatism due to movements are well known as etiological factors in the production of late ulnar neuritis secondary to fracture of the humeral condyles and of brachial neuritis due to cervical ribs or fascial prolongation from rudimentary cervical ribs. The mechanism in the production of meralgia paraesthetica Dr.

Stookey believes is comparable to these two well known conditions.

The surgical treatment suggested is section of the external cutaneous nerve without resection allowing the nerve ends to lie in alignment in order to facilitate regeneration. Defects of 1-2 cm. may be bridged spontaneously when the nerve ends lie in smooth fascia planes. Were spontaneous regeneration to take place the external cutaneous nerve would thus be lengthened and recovery of sensation would follow. In any case, permanent anaesthesia in the area of the external cutaneous nerve is to be preferred to the paraesthesia and pain found in meralgia paraesthetica.

THE CONVULSIVE STATE

SAMUEL BROCK

- I. Introduction: Definition.
- II. Pathophysiology: Types of Convulsions.
- III. Analysis of factors involved in the production of convulsions:—(a) humoral, (b) cerebral.
- IV. The Cerebral Vascular Apparatus (Vasomotor theory).
- V. Psychological Theories.
- VI. Heredity: "Reflex Epilepsy."
- VII. Pathological Considerations.
- VIII. Conclusions.

I

For a number of years it has been evident that epilepsy is not a disease *sui generis* but a symptom complex of a many-sided nature. As a consequence, one began to speak of "The epilepsies." Of late, however, the term "convulsive state" has been introduced to replace the time-worn word "epilepsy" with its traditionally restricted connotations.

By the convulsive state is meant a paroxysmal disorder of clonic or tonic muscle spasm involving larger or smaller segments of, or even the entire body. The resultant movement is an involuntary disordered, utterly purposeless one, throwing the part, or the entire body out of normal into an abnormal posture. Whether consciousness is or is not disturbed will depend upon considerations to be discussed later.

In the idiopathic type of convulsive state (*grand mal*) three phases may be recognized in the order of their appearance, one—a fleeting *flaccid stage* during which the individual falls: two—the *tonic phase*; three—the *clonic phase*. Quite rarely the attack may be limited to the flaccid stage in which the acute general loss of tone produces sudden “deposturing” or collapse. The tonic stage with unconsciousness is due to suspension of cortical function, and the uninhibited activity of brain stem centers. The succeeding clonic phase indicates return of cortical activity, even irritation. The tonic and clonic stages may appear separately in man, and for the sake of clarity will be so considered in the following.

II

The types of such seizures are:—(1) Tonic, and (2) Clonic.

The tonic type is often seen as stated. It succeeds the very transient flaccid stage of the so-called *grand mal* seizure, and is usually generalized. Brain stem centers are functionally disconnected from the dominant cerebral cortex, and their uninhibited activity or their isolation results in a decerebrate rigid state. Normally the inhibiting impulses are believed to be mediated by the fronto-ponto-cerebellar pathways (Weed, Warner and Olmstead). The stimuli are transmitted from the brain stem centers to the final common pathway probably along so-called extra-pyramidal pathways. This tonic state consists of a widespread spasm of the extensor muscles. The head is retracted, the back arched, the extremities extended and adducted, the hands are pronated, the fingers are flexed, the feet are in equinus, the jaw is tightly closed (Sherrington, S. A. K. Wilson).

In man the upper extremities are usually flexed, and the head and eyes turned to one side. Consciousness is lost. Time will not permit me to go into the well-known accompanying vasomotor, respiratory, pupillary changes, nor into the question of aurac, etc.

The clonic or Jacksonian fit is due to irritation of the motor cortex of the brain; the abnormal stimuli are carried by the intact pyramidal tract to the lower motor neurone, thence by way of its final common pathway to the musculature. If the focus of irritation spreads, then adjacent centers in the Rolandic

area are affected in a very regular manner which is conditioned by their well-known anatomical juxtaposition. The movements are interrupted, and frequently segmental. When this type of convulsion occurs alone, consciousness is not disturbed, until the movement spreads from one half to the other half of the body.

A spinal and bulbar form of convulsion is best seen in cases of strychnine poisoning. Here there is anarchy in the realm of the lower motor neurones, and a tonic extensor spasm is noted, comparable in many respects to the above-described. Consciousness is fully retained.

III

If one analyses the many factors involved in the production of the convulsive state, it becomes evident that they may be grouped under one of two headings:—A. Cerebral; B. Humoral. The experimental work of W. E. Dandy and R. Elman illustrates this duality best. Let us give a normal cat absinth by mouth. In large enough amounts, convulsions will result. Here we have the operation of a pure humoral exogenous factor. Nextly, produce a lesion in the cerebrum of the animal either by simple extirpation of the cortex and sub-cortex or by simply placing a foreign body beneath the cortex. One to five months later it is found that one-third to one-seventh the initial dose of absinth will be convulsogenic. By injuring cerebral tissue a cerebral factor is introduced.

In Table I we have the humoral factors.

TABLE I

Humoral Factors

- | | |
|--|--|
| I. <i>Exogenous</i> | II. <i>Endogenous.</i> |
| 1. Alcohol, lead (absinth, c a m p h o r—monobromate, santonin, picrotoxin, apomorphin, etc.). | 1. Uremia. |
| 2. Insulin (anoxemia?). | 2. Eclampsia. |
| 3. Alkalosis (due to hyperventilation). | 3. Endocrine dyscrasias. |
| 4. Foreign Proteins. | a. Parathyriod |
| | b. Thyroid |
| | c. Pituitary. |
| | 4. Toxins of the infectious diseases in infants. |
| | 5. Spasmophilia. |

Among them, certain items deserve especial comment. In rare instances, the individual may suffer from the convulsive state only when sufficient alcohol is imbibed. Rosett in this country and O. Foerster in Germany have drawn attention to the effects of forced over-ventilation of the lungs. In normal persons, tetanic features appear. In 55% of epileptics, the convulsive state is precipitated. The alkalosis produced by the deep breathing is, in some way responsible for the attacks, possibly through disturbance of the calcium ion balance in the blood (F. Georgi). The tetany induced in normal individuals points to the parathyroid gland, and disturbed calcium metabolism. In this connection, Geyelin, of New York, deserves credit for emphasizing the beneficial effects of starvation on those afflicted with convulsions. Workers in Cobb's Laboratory in Boston, have proven that the *acidosis* accompanying starvation is the decisive factor in this prevention of convulsions.

Strangely at variance with this work is that of the Italian investigator Cuneo, who believes that there is a disturbance in the starch metabolism resulting in the formation of certain acids (acetic, lactic, butyric, tartaric). Normally the liver and small intestine break these up into urea and sodium carbonate. In epilepsy they are found unoxidized in the urine*. An acidosis results, in the presence of which the cellular nucleo-histon bodies split into nucleinic acid, and a convulsogenic proteose (The salts of the afore-named acids are also convulsogenic). Donath (quoted by Muskens) believes that in the convulsive state, alkaloid-ammonium compounds, fragments of normal metabolism, react on a nervous system, the threshold of which has been lowered by either hereditary, or congenital, or toxic, or infectious, or traumatic affections. These compounds are trimethylamin, cholin, kreatinin, guanidine, and ammonium carbonate. Except for the first (trimethylamin) Donath produced convulsions with these agents.

A number of observers have studied the question of the split products of protein metabolism. L. M. Wallace and W. D. Nicol (England) found that about 20% of epileptics gave positive skin reactions. They removed the offending proteins

*Osnato, Killian and their co-workers have found increased lactic acid in the blood and cerebrospinal fluid of epileptics in the interparoxysmal period.

from the diet in some of these cases, gave others peptone by mouth, and reported good results. Others, including J. S. Collier, were disappointed in the use of protein therapy. In connection with anaphylaxis, V. M. Buscaino's work deserves mention. Examining 396 thyroid glands he isolated an abnormal protein from the thyroid of 71% of epileptics. Abderhalden tests with the serum of epileptics reacted positively with the thyroid of epileptics much oftener, and more intensely than with non-epileptic thyroids. In certain cases he regards the convulsion as an anaphylactic crisis.

In the group of endogenous humoral factors, the endocrine dyscrasias are of especial interest. The role of the parathyroids in the convulsive state of tetany is well known. In three cases of severe epilepsy, O. Foerster implanted human parathyroid glands. He reports unmistakably beneficial effects on the number and intensity of the convulsive seizures. In regard to the thyroid gland, Buscaino's observations, above-mentioned, are of interest.

Elsberg and Stookey showed that thyroidectomized animals are more susceptible to absinth in the production of convulsions. The parathyroid glands may also have been injured in their experiments. The foregoing observations lend weight to the belief that the parathyroid and thyroid glands cooperate in removing toxic convulsogenic elements (foreign protein split products?) from the blood stream (Timme, Zabriskie).

As regards the pituitary gland, two points deserve mention. One is the frequency of signs of dyspituitarism (acromegalic features, or Fröhlich's syndrome) and sella turcica changes demonstrable by X-ray, in the epileptic. The other is the hypothesis in which the pituitary gland is believed to enlarge periodically in a sella too small for it. This results in a suspension of function of the posterior lobe which is said to produce an increase of general cortical irritability. The nearby uncinate gyrus is pressed upon and is apt to be the initial explosive focus.

The gonads have been omitted from the table because the precise role they play is very difficult to define.

Let us pass to a consideration of the cerebral factors.

The following table is an enumeration of the Cerebral Factors.

TABLE II
Cerebral Factors
A. Diseases

1. Neoplasms (including bony growths).
2. Congenital and heredo-degenerative disease.
3. Degenerations and sclerosis (*viz.* multiple sclerosis, tuberculous sclerosis, encephalitis periaxialis diffusa, senile cortical atrophy, presenile gliosis, etc.).
4. Traumatic processes.
5. Infections and parasitic disease, (*viz.* lues, tuberculosis, encephalitis, abscess).
6. Vascular disease (vascular spasm, arteriosclerosis, hemorrhage, emboli).

B. Irritants

1. Mechanical (*viz.* air).
2. Electrical.
3. Thermal.
4. Chemical (*viz.* strychnine painted on the cortex).

C. Psychogenic Processes

1. Theory of Regression (L. Pierce Clark).
2. Theory of Rosett: The normal epileptoid reaction.
3. Hysteria.

From the above table it becomes evident (A) that almost all organic cerebral diseases can induce the convulsive state. Is it possible to find a single pathological determinant common to all these states which is the true cerebral factor?

MacRobert in this country and Muskens abroad both suggest dysmyelinization as a possible factor. The former stresses "an anatomic defectiveness in which the vital feature is a paucity of functionally active fibre tracts. . . . This specific defect may be but a part of a wide spread neural agenesis or may exist alone, the result of a failure in the final stages of development, namely myelinization of the nerve fibres." A kind of defective insulation of the nervous stimulus results. In this connection paroxysmal spasms are rarely encountered in amaurotic familial idiocy, although Hassin stresses the frequent occurrence of decerebrate extensor hypertonus. Doctor B. Sachs does not regard convulsions as an essential part of this disease in which

almost all the ganglion cells of the nervous system degenerate. Whereas in encephalitis periaxialis diffusa of Schilder, a disease in which the fiber tracts suffer most in a dysmyelination process, convulsions are frequent. Yet the dysmyelination theory hardly seems tenable when one considers the important humoral factors. It has not been proven by any of the finer anatomical studies, and throws no light on the convulsive state produced by certain vascular conditions to be described.

The observations of O. Foerster seem to show that in the vascular mechanism of the brain we will find the basic cerebral factor. On the operating table he has observed at least one hundred times a *preparoxysmal* vasoconstriction and anemia of the exposed brain with a diminished volume. The tonic convulsion then occurs with a rapid fall of cerebrospinal fluid pressure. The removal of cortical function due to the vasoconstriction permits the unbridled or isolated brain stem centers to manifest this tonic decerebrate phase, and serves to explain the unconsciousness. Then venous stasis comes on rapidly accompanied by a great increase in brain volume and cerebrospinal fluid pressure. The stasis now produces cortical irritation and the clonic (Jacksonian) phase appears as a consequence. This vasomotor theory (Nothnagel) explains the attacks, sudden onset, and cessation, and the radiation of a Jacksonian cortical attack. The sensory aura and the post-paroxysmal weakness may be ascribed to transient loss of function from local anemia. Further weight is lent this vascular basis when we consider the various vascular conditions which are able to provoke the convulsive state.

TABLE III

Vascular States

A. Disease of Cerebral Blood Vessels

- | | |
|-----------------------------|----------------------------|
| 1. Arteriosclerosis. | 6. Embolism. |
| 2. Endarteritis obliterans. | 7. Congenital smallness of |
| 3. Angiospastic migraine. | carotids or vessels of the |
| 4. Raynaud's Disease. | Circle of Willis. |
| 5. Aneurysms. | |

B. Changes in Cerebral Circulation

1. Heart block.
2. Restoration of previously impaired cerebral circulation.
 - A. After drowning.
 - B. After strangulation.
 - C. After suffocation.
3. Pressure upon, or ligation of carotids and vertebral arteries.

Recently more evidence favoring the vasomotor theory was given by the work of O. B. Meyer. Pieces of cortical arteries show rhythmic spontaneous contractions when placed in normal serum. These can be kymographically reproduced. If the serum of an epileptic be used the contractions are absent or diminished; this occurred in 15 out of 17 cases irrespective of the time (with regard to the paroxysm) of the withdrawal of the serum. In six cases of hyperthyroidism the contractions were increased.

Some years ago MacRobert and Feinier explained the frequency of the convulsive state in temporal lobe neoplasms by assuming that the pressure of the tumor interfered with the circulation in the overlying Sylvian artery.

Increased cerebrospinal fluid pressure of itself does not cause convulsions (W. M. Kraus), but if other factors are present then such increase will help precipitate the convulsive state (Elsberg and Pike).

V

The convulsive state has also been regarded as essentially of psychogenic origin, especially by L. Pierce Clark. Following the psychoanalytic approach, he regards the fit as a regression, a withdrawal from reality into the blessed Nirvana of the intrauterine foetal state. Objections to this point of view are many. It does not account for the occurrence of convulsions in deep sleep (which, in itself, is an adequate escape from reality), the incidence of convulsions in animals of the mammalian phylum, nor does it explain the status type of convulsion with its frequent fatality. This point of view in no way clarifies the convulsive state based on known organic conditions as general paresis, tumor, etc.

In a somewhat different category is the ingenious theory of Rosett. He believes that normally "a stimulus requiring sudden movement on the part of the organism or the narrow focusing of attention, and certain functions such as sleep, defecation, sneezing, coughing, parturition, lead to a temporary reduction or extinction of the cerebral functions." This may lead to a "tonic contraction of the entire skeletal musculature resulting in the posture of decerebrate rigidity."

"The biologic purpose of the reaction is the automatic fixation of the relatively central joints preparatory to any possibly needed movement of relatively distal segments of the body and limbs." To its normal incidence he applies the term "normal epileptoid reaction."

Perhaps this conception helps to explain the tendency of the seizures to appear as the individual is going to sleep or awakening ("Vorzugsmomente" of the German writers), and the very occasional appearance of convulsions in the beginning of ether or chloroform narcosis (Patch).

Yet Rosett is not able to explain the reason for the appearance of that periodic, massive, exaggerated response which constitutes the convulsive state. He has contributed some interesting psychological side lights to the problem.

To discuss the hysterical convulsion would require a consideration of hysteria which would take us too far afield. Obviously its mechanism is quite different from the convulsive state herein considered.

The reason for the periodicity of the convulsive seizure is unknown. The assumption of any special theory hardly explains it. In fact I think that when we know why the attacks are recurrent or paroxysmal we shall have gotten down to the very fundamental understanding of the disorder. Collier believes that the periodicity and other facts argue strongly for a disturbance in metabolism,—a "toxipathic" (*i.e.*, a humoral factor) as the basic cause.

VI

Many have emphasized the element of heredity in the convulsive state. In his recent analysis Muskens shows that about one-third of his cases had epileptic forbears in the direct and collateral line. About one-eighth revealed insanity in the direct

and collateral line. In heredity, alcohol played a part in about one-twentieth of the cases, and lues in only about one-fiftieth. Striking as these figures are they do not aid us at all in the study of the fundamental causes of the seizures.

Before speaking of the pathology, brief reference may be had to the so-called "reflex epilepsy" which belongs to the field of romance. Diseases in the nasal, aural, dental, genital and other spheres were held responsible for the attacks in some mysterious manner. In his analysis of two thousand cases Muskens found no instance of this type. To-day we hear very little of this old myth.

VII

Is there a fundamental pathology to the convulsive state? To be sure, ganglion cell degeneration, subpial marginal gliosis, and other more generalized glioses have been described. Gerstmann found atypical and even foetal cells in the molecular cortical layers. Volland found regularly karyolytic and tigrolytic degenerative changes in the anterior horn cells in myoclonic epilepsy. A milky cloudy pia has been the sole finding in cases of focal epilepsy in which biopsies have been obtained (Muskens, *et al.*). Alzheimer at one time (1898) even went so far as to say that ("Man könnte die epileptischen Anfälle als Folge eines Druckes ansehen, den die herbere geschrumpfte Rindenoberfläche auf das tiefer liegende Hirngewebe ausübt.")—One could regard the epileptic seizure as the result of a pressure, which the sharply shrunken cortical surface exerts upon the deeper lying cerebral parenchyma). Yet with the passing of time, a different attitude of mind has been forced upon most observers. This is due to the fact that negative findings have been recorded by careful observers in cases which had neither lasted too long nor been accompanied by mental deficiency or dementia. The general opinion now held is that the pathological changes found are the result of the long enduring process, not the cause (Binswanger, Zabriskie, *et al.*). Hence the idiopathic convulsive state has no essential pathology. Alzheimer and his pupils believe that the convulsive state is a common attribute of warm-blooded animals, and is to be regarded as a reaction produced by a humoral poison on a nervous system in which lessened tolerance, or lowered threshold, has been brought about.

VIII. *Conclusions*

All facts agree with the above concept. It permits the study of neural and extraneural factors,—the cerebral and the *important humoral* ones. It would seem, then, that the convulsive state is either brought about by (1) a group of poisons operating upon the cerebral vascular mechanism producing vasoconstriction and cerebral anemia, then congestion, or (2) by local cerebral disease or disturbed vascular conditions upsetting the vascular equilibrium or by (3) combinations of the above.

Somewhere in his writings, Francis Bacon says that it is easier to derive knowledge from a state of confusion than from chaos. The convulsive state is still a confused one, but thanks to the work of many investigators all over the world, the grim spectre, chaos, has been put to rout.

THE ECLAMPTIC CONVULSION

WILLIAM E. CALDWELL

It must be confessed at once that our knowledge of the eclamptic convulsion has not yet been rescued out of chaos into the more hopeful realm of confusion.

DeLee's dramatic description of the eclamptic convulsion of course is known to the majority of you. Still I will quote it.

"The Attack.—The pupils dilate, the eyes are turned, and the head also, to one side; the patient opens her mouth, then the jaw is pulled laterally, and there may be a cry or a sigh. The whole body becomes rigid; the features are distorted; the arms flexed; hands clinched; the feet inverted; the toes flexed, and the whole person drawn to one side in a tonic spasm. This condition lasts for a few seconds, then the jaws open and close violently, the eyelids also, the twitchings beginning in the face, then usually one arm, then the leg, and now the whole body. This is a violent clonic convulsion, which may throw the patient out of bed against any object. Severe injuries can result—even fractures of the skull or long bones; the tongue is protruded; the teeth may chop it up. Foam, often tinged with blood, comes from the mouth. The respiration is completely stopped, the chest being rigid. The pulse is high and strong; later it grows

weaker, but may be hard to feel because of the convulsion. In rare cases the pulse is weak and the arterial tension low from the start, a fact which is explained by degenerative changes in the heart. The blood-shot eyes protrude, the face is swollen, the cyanosis is extreme, the lips are purple—together the picture is a horrible one. Gradually the convulsive movements remit, a few twitches or jerks take place, the patient lies quiet, the heart thumping violently against the chest-wall. For a few seconds the woman appears to be dying, but there is a long sigh, and stertorous breathing becomes established, coma supervening. Soon the respirations quiet down. In the favorable cases the patient wakes up after a short time bewildered, severely sore in all the muscles. After from a few minutes to an hour another fit occurs, or she may have no more. With recurring convulsions the intervals become shorter and the patient lies in deep coma all the time."

The pathological changes in fatal cases are distinctive in the liver, where areas of necrosis and hemorrhage with thrombi of agglutinated red cells are found in the periportal spaces. Small or large hematmata frequently underly Glisson's capsule. The kidneys show changes in varying degrees of severity from simple cloudy swelling to the rarer cases of extensive cortical necrosis. Areas of myocardial degeneration are often found in the heart. In the brain and nervous system various findings have been reported—anemia, hyperemia, edema and dehydration. The most constant but by no means invariable findings are multiple hemorrhages of varied size and distribution.

A brief outline of the facts which a satisfactory theory must fit may be given.

Eclampsia occurs in the later months of pregnancy with increasing frequency as term approaches. It is more common in primiparas and in multiple pregnancies and in hydramnios. It has a seasonal incidence, being more frequent in the winter and spring months, and is more common in northern latitudes. It is usually though not always heralded by slight or severe degrees of such symptoms as edema, headache, visual disturbances, epigastric pain, rising blood pressure, albuminuria and oliguria and hyper-reflexia.

The acuteness of onset of the eclamptic convulsion leads naturally to the idea that it is due to some toxin suddenly released into the blood stream, and research has been directed to the discovery of such a toxin. The tendency of eclampsia to improve following foetal death or expulsion suggests a foetal origin, and unsuccessful attempts have been made to isolate toxins from foetal metabolic products, or from fragments of syncytium and amniotic villi which are continually entering the maternal blood stream. The hypothetical escape of foetal blood of unlike group from that of the mother, into the maternal blood stream, with resulting thrombus formation, has not found statistical support. An anaphylactic reaction to foetal products has been port. An anaphylactic reaction to foetal products has been suggested but not proved. Placenta decomposition products have been proposed as the source of the toxin, but proof is wanting.

A more intensive study of the maternal organism during pregnancy and its toxemias has more recently held the center of attention. Chemical studies of the blood and urine have been made in a large number of cases. Most insistent have been the attempts to find in the retention of some product of protein metabolism the cause for the eclamptic explosion. These have led for the most part to negative findings. The blood uric acid is usually raised, but non-protein nitrogen is seldom retained and the nitrogen partition is variable. Recently the toxic qualities of histamine and the guanidines have been studied and have been thought to be important causes of convulsive reactions. The blood sugar is thought by some to be raised in eclampsia, by others to be low. An increase in the lactic acid of the blood has been described. The study of the inorganic constituents of the blood and their equilibria are of great interest. Most writers agree that there is a decreased plasma carbon dioxide combining power. Staecher reports a general tendency to a lowered ratio in the calcium and phosphorus contents of eclamptic blood. Such observations fit in very well with the functions which these substances are held to have in the metabolism of muscle irritability. They are not, however, invariably found in eclampsia. Abnormalities of the thyroid, parathyroids, ovaries

and pituitary have been thought to cause eclampsia and isolated cases appear to support such a conclusion, but such theories leave many facts to be explained. In recent studies by means of the capillary microscope, spasmodic contractions of the vessels in toxemic and eclamptic patients have been described which suggest the theory of spasmodic constriction of the cerebral arterioles as initiating the mechanism of eclampsia. More evidence along the lines of this very attractive theory is required.

There is nothing definitely characteristic about an eclamptic to differentiate it from the uremic or even the epileptic convulsions. Convulsions occurring in the latter half of pregnancy without albuminuria and without increase in blood pressure may be eclamptic but should certainly have a thorough neurological examination to exclude other conditions. The marked reduction in the eclamptic rate which occurred during the war in Germany is very significant, since their food supply was greatly curtailed.

Subnormal women, especially when the cardiovascular renal and nervous systems are affected, should be relieved of every possible strain during their pregnancies.

Normal women cannot be allowed to put a strain on their alimentary, excretory and nervous systems. The bacterial infections occurring during pregnancy are sometimes enough to upset the delicate balance of the woman.

In the vast majority of eclamptics, spontaneous labor occurs and the mortality has been reduced in direct ratio to the discontinuance of operative interference. Some cases still require operative deliveries, but the proportion is small.

The convulsion, the restlessness and irritability added to an already strained cardiovascular system will cause a disastrous end if not controlled.

During the past thirty years the work of Tweedy, Loomis and especially Strogonoff has gradually worn away the prejudice against the use of opiates, and morphine is used to a very great extent in most clinics. For the rapid control of frequently occurring convulsions or mania with the resulting exhaustion, paraldehyd directly into the vein has been effective. Recently Lazard's suggestion of the use of magnesium sulphate directly into the vein has proven of great value in temporarily reducing

the blood pressure and quieting the patient. Together with morphine and bleeding, it seems to have reduced the mortality in this condition. Rest and relief from strain are still most valuable means of treatment. A low protein salt-free diet is of value, but milk in spite of its high protein and mineral salts seems to be just as efficacious in some cases.

No theory has yet been proposed which satisfactorily explains all the phenomena. To recapitulate we may quote the points listed by Williams which the required theory must satisfy.

1. The genesis of the hepatic lesions.
2. Predisposing influence of primiparity, multiple pregnancy, hydramnios.
3. That the disease is more common in northern latitudes than in the tropics.
4. That the incidence increases as pregnancy approaches term.
5. That marked edema is usually a favorable sign, while its absence adds to the gravity of the prognosis.
6. That true eclampsia rarely occurs, whereas chronic nephritis gives rise to increasingly serious trouble in each succeeding pregnancy.
7. That intrauterine death of the foetus is usually followed by improvement.
8. That a milk diet which is high in protein and mineral constituents is as efficacious as one low in protein and free of salt.

The object of the Chairman in having this hackneyed subject once more presented is to enlist the help of the neurologists in solving the various problems which this dread condition presents. We regret that we are not able to bring out any new point or suggestion in this presentation.

A BIT OF FINANCIAL HISTORY OF THE ACADEMY

The rapidity of change during the last half century has been so enormous that one sometimes forgets the gigantic scale upon which our civilization is based. This is shown in a small way by a review of a bit of the old financial history of the Academy.

Less than forty years ago, in 1889, the last complete year in the old building at 12 West 31st Street, the receipts of the Academy amounted to \$6,702.62, the expenses to \$6,827.21.

In 1888, the Academy determined that it would have to seek a larger building because there was no longer any room for books or a hall large enough to hold the meetings although an extension had been built in the rear of the old building through the efforts of Dr. Abram Dubois, which was known as Dubois Hall.

Funds were raised during 1888 and 1889 amounting to \$78,474.03. The land and building cost \$284,426.59. The new building was financed through the gifts of Fellows and their friends, the Celine B. Hosack legacy of \$70,000 and by a mortgage on the property. In order to make the final payments, the Academy sold \$30,000 worth of bonds to the following Fellows:

Hermann Knapp	\$5,000
Everett Herrick	2,000
Everett S. Warner	1,000
J. A. Booth	500
E. C. Billington	2,000
William Balser	2,500
C. W. Stimson	2,000
A. L. Loomis	3,000
A. Jacobi	3,000
F. A. Castle	1,000
LeRoy M. Yale	500
Henry D. Noyes	1,000
M. Allen Starr	1,000
Alexander Hadden	4,000
John C. D. Kitchen	1,000
R. Kalish	500

The interest on the bonds was paid regularly and with the increase in dues it was possible to pay off a certain amount of them annually.

In 1890, the Academy was installed in its new building at 17 West 43rd Street. In the annual report of the Treasurer for the year 1891 he writes: "The opening of our new home and the development of its facilities, which are unsurpassed, have been attended, not alone with pleasure to its Fellows and friends, but that which this department has been compelled to recognize, an increase in its expenses."

In May, 1891, the Academy was apparently facing a deficit and an assessment of \$10 was levied and six hundred and ninety-eight Fellows subscribed. The dues were increased to \$20 a year in 1892. The expenses of the Library had increased at that time and in 1893 there was a still further increase but the salary of the Librarian and the total expenses of the Library for the year 1893 were less than the salary of the Librarian for 1927.

After the new building was opened, the building fund was continued as an open account and in several years there were received in subscriptions \$19,776 as well as some income from the general permanent fund and from current account which enabled the Academy to redeem \$20,000 worth of bonds in 1893.

In 1897, the Academy borrowed from the bank \$7,000 on its note which was used to retire the remaining bonds outstanding. During the following years the admission fees were set aside for the retirement of this note until it was entirely paid in 1905. On October 19 of that year, the Academy voted to appropriate admission fees to the endowment fund and that has been continued to date.

SETH M. MILLIKEN.

SUMMARY OF ACTIVITIES
OF THE
EXECUTIVE COMMITTEE OF THE PUBLIC HEALTH
RELATIONS COMMITTEE

MONTH OF JANUARY, 1928

Every month several important matters come before the Committee for consideration. With regard to some of them, immediate action can be taken; the majority, however, require the gathering of facts and the weighing of evidence. Due to this, some of the items reappear on the calendar of the Committee many times during the year. Among the subjects which received attention during the past month were:

1. *The Work of the Chief Medical Examiner*

It was with the aid of the Public Health Relations Committee of the Academy that legislation was secured more than a decade ago abolishing in New York City the obsolete and inefficient coroner system and substituting in its place the office of the Chief Medical Examiner. The new system started on January 1, 1918. Under the administration of Dr. Charles Norris, the medico-legal work of the City was carried out with efficiency, honesty and justice.

In recognition of this service, the Committee on Public Health Relations voted to tender jointly with the Committee on Medical Education a dinner to Dr. Norris. On this occasion consideration will be given to a proposal to establish in New York City an institute for the teaching of forensic medicine in connection with the Chief Medical Examiner's office and under the auspices of the several medical schools of the city.

2. *Uniform Classification of Diseases*

Statistical comparisons which are of value to medical science and to public health administration are rendered difficult by a lack of a generally accepted nomenclature in hospital practice. The Committee voted to arrange for a meeting at the Academy to consider the subject to which representatives of the government medical departments as well as the several

national bodies would be invited. The desirability of working out adequate statistical procedures for medical accountancy in hospitals was likewise considered.

3. *Request from the City Housing Corporation*

Consideration was given to a request from the City Housing Corporation for the outlining of a study on the effect of housing on health.

4. *Functions of the New York State Board of Charities*

In conference with the Chairman of the State Board of Charities the powers, the functions and opportunities of the State Board of Charities were discussed and a special subcommittee was appointed to pursue the subject further.

5. *Admission to Tuberculosis Hospitals*

The present method of the admission of patients to tuberculosis hospitals is not fully satisfactory and plans for the improvement of the service were discussed with the appropriate municipal authorities.

6. *Mental Hygiene*

The alleged increase in mental disease and delinquency has prompted the Committee's inquiry into the mental hygiene movement, and a special subcommittee was appointed to study the efforts that are being made in the prevention of insanity and crime.

7. *Clean Streets*

The dust and litter in the streets, although not a major problem in public health, is a matter which should not be neglected. Vigorous public protest against the antiquated and inefficient method in vogue for the collection of ashes and refuse will undoubtedly lead to desirable improvements. The Committee communicated with the Mayor and the Commissioner of Street Cleaning.

8. *Development of Convalescent Care*

Since the time of the study of the facilities for convalescent care which was made by the Committee several years ago and

since the formulation of standards for the guidance of convalescent homes, considerable progress has been made in this city. The importance of coordination of available facilities and of raising the prevailing standards has been generally recognized. The creation of the Convalescence Service in the Hospital Information and Service Bureau has given an impetus to a better understanding of the entire problem.

Miscellaneous

Other matters which came before the Committee during the month were:

Ventilation of school buildings, consolidation of municipal hospitals, the reorganization of the City Health Department, and the need of a change in the composition of the Board of Health; also the so-called Parents' Exposition which is to be held in April (16-28) at the Grand Central Palace.

LIBRARY NOTES

FAUCHARD BICENTENARY EXHIBITION

To those interested in the origin and development of dental literature, which in other words is equivalent to the beginning of dentistry as a branch of medicine, the year 1928 is of intense interest and importance. This year we find is the occasion of three distinct important epoch making events in dental science that entitles each to be so commemorated.

First, the 60th anniversary of the founding of the First District Dental Society in 1868. Second, the 380th anniversary of the publication of the first dental book written (by Walter Hermann Ryff) especially for those then interested in this particular phase of Medicine, 1548. Third, the 200th anniversary of the publication of the first important dental (text) book *Le Chirurgien Dentiste* by Pierre Fauchard which amply entitled him to be called the "Father of Dentistry."

Besides these the year 1928 recalls the anniversaries of the birth of the following men who made important contributions to dental science. 250th of Pierre Fauchard, 1678-1761; 200th of John Hunter, 1728-1793; 100th of James Edward Garretson, 1828-1895; Benjamin Ward Richardson, 1828-1896; Jonathan Hutchinson, 1828-1913; Norman W. Kingley, 1828-1913. Also the 100th anniversary of the death of Robert Woofendale, 1742-1828, the earliest pioneer, of which we have definite information, to have practiced in this country.

The Books of Pierre Fauchard

The progress that dentistry made in its scientific development up to the early part of the eighteenth century is best portrayed in the writings of Fauchard. For centuries it was in a primitive condition, attaining the highest degree of development in France, until it there reached a point which entitled it to be considered a special branch of medical science. Out of pride or jealousy, the dentists before Fauchard's time refrained from publishing anything concerning their art. He was determined to break down this practice by publishing the results of all their studies and experiences, besides the technical details, before closely guarded, which according to the idea of that time constituted the secrets of the profession.

Fauchard did not create the dental art, for as he states, the greater part of the facts enumerated in his works were already known before his time, but were seldom mentioned in the writings of his predecessors. He did, however, make important contributions to this specialty, and credit must be accorded him for his inventions and improvements on the technical side. He placed dentistry on a scientific plane through collecting and incorporating in one book the entire doctrine of the dental art then known, theoretical as well as practical. Not only was Fauchard the first to advocate a broader education for dentists, but he also gave to dentistry its first scientific work. His *Le Chirurgien Dentiste* in two volumes, written in 1723 and published in 1728, was undoubtedly prepared with the idea of conveying all he knew about odontology, and in a manner that would be of greatest help and interest to those who succeeded him. It served its purpose so well that it remained the authoritative work for over a century. His treatise marks a distinct epoch in the progress of dentistry, and may truly be regarded as the first of dental publications in France during the eighteenth century.

In 1773, the first edition was translated into German by Augustinius Buddaneuss. The second French edition was published in 1746, and contained the first accurate account of "pyorrhea alveolaris;" the third was published in 1786, after Fauchard's death. The book was practically completed about 1723. Although carefully written, yet in order to make it as accurate as possible, Fauchard submitted the manuscript to medical friends for additions and corrections. To many, the writings and ideas of Fauchard would today be a revelation.

Upon the completion of the Lister Centenary Exhibition, The New York Academy of Medicine has arranged to commemorate, during the month of February, the above three events, by a public exhibition of dental books, records, photographs, etc. This exhibit will be the most complete and accurate record of the progress of dentistry as portrayed by its literature that has as yet been attempted, and will be as fitting a compliment to our science as could be paid by the medical profession.

The value of a library is the use to which it is put. Were the history of dentistry to again be rewritten, it could easily be compiled in our valuable library.

In arranging the exhibit an attempt has been made to illustrate every particular period in the development of dental literature.

1. Our first knowledge of medicine and of the dental art was derived from stone pillars. Examples—(a) Code of Hammurabi sculptured, c. 2000 B. C. (b) Babylonian Tablet. Then from various papyri. (c) Papyrus Ebers, c. 1500 B. C.

2. Dentistry's debt to medicine. The period prior to 1500 A. D., the earliest printed medical books known as "Incunabulas." A few will be shown to represent the two hundred odd medical writers that laid the ground work for all our early dental material prior to the time of Fauchard.

3. An example of this debt—Eustachius—*Libellus de dentibus*, 1563, with those works he utilized to write the first dental anatomy and histology. Actuarius (c. 1280) Aretaeus (270 B. C.) Aristotle (384-322 B. C.) Celsus (25 B.C.—50 A. D.) Cicero (106-4 B. C.) Erasistratus (300-245 B. C.) Fallopius (1523-62) Galen (130-200) Hippocrates (360-377 B. C.) Meletius (c. 700 B. C.) Pliny (27-79) Ryff (1500-62) Vesalius (1514-62) Arculanius (-1484).

4. First dental book published, written for the laity and not profession. Series of twelve editions of *Zene Artznei's* of which we have a record as having been published between 1530 and 1576. Grouped with the original works of Avicenna, Celsus, Galen, Mesue, Pliny and Vigo from which works the anonymous author (Meister Lorentz?) obtained his material.

5. Series of "Firsts" in various countries.

a. Germany, 1548, Ryff, W. H. *Nutzlicher bericht, . . . wie man den Mundt, die Zan. . . .* First to be published for the profession.

b. Spain, 1557, Martinez, Fr. *Coloquio Breve Y copediofo. . . .*

c. Italy, 1563, Eustachius, B. *Libellus de dentibus.*

d. France, 1582, Hemard, Urbain. *Recherche De La Vraye Anathomie Des Dents*.

e. England, 1686, Allen, Chas. *The Operator for the Teeth*: . . .

f. America, 1801, Skinner, R. C. *A Treatise on the Human Teeth*, . . .

g. Mexico, 1823, Parrott, G. S. *Reflexiones La Importancia de Conservar la Dentadura*. . . .

6. Dental books published prior to 1700. Digitus, Jn., 1587; Horsti, 1596; Rulandi, 1597; Ingolstetter, 1595; Liddle, 1628; Strobelberger, 1630; Typkowski, 1674; Stisser, St. Fr., 1675; Martin, B., 1690.

7. Fauchard's *Le Chirurgien Dentiste*. Complete editions—1728, 1733, 1746, and 1786. Photographs of the original manuscript of vol. 1. His Chateau. Historical Records of his work.

8. Fauchard's Contemporaries. The most complete exhibit of important dental literature of this period. France—Jourdain, 1724; Gerauldy, 1737; Bunon, 1741, 1743; Mouton, 1746; LeCluse, 1754; Bourdet, 1757, 62, 71, 82, (2) 87; Auzebi, 1771; De Chemant, 1797; Mahon, 1798. Germany—Kraeutermann, 1747; Stumpff, 1753; Runge, 1755; Pfaff, 1756; Pasch, 1767; Brunner, 1771; Courtois, 1778; Plenck, 1778, 79, 86, 1803; Serres, 1778, 91, 1804; Andree, C. A., 1790; Zincker, 1794; Hirsch, 1796; Ettmuller, 1798, 1800. Italy—Carnelli, 1793; Comparini, 1793. England—Hurlock, 1742; Berdmore, 1768, 70; Ruspini, 1750, 68, 97; Woofendale, 1783; Blake, 1801; Fox, 1803.

9. John Hunter's *Natural History of the Human Teeth*. An example of the intense interest in dentistry of that period as shown by the number of editions and translations published. London, 1771, 78, 78, 2nd edition, 1803, 35, 61; Dordraci, 1773; Leipzig, 1780; Hague, 1780; Paris, 1839; Philadelphia, 1839; New York, 1839.

10. Contemporary American dentistry as gathered from early New York newspapers beginning with James Mills, 1735:

the Woofendales, Baker, Porce, Hamilton, Dubuke, Fisher, Dustwige, the Greenwoods, Skinner, LeMayeur, and others.

11. First dental publications in America. Fourteen in number, 1801-28.

12. Constitution and Transactions of the first dental societies. "Society of Surgeon Dentists of the City and State of New York," 1834. First minute books of the "Dental Surgeons of the City of New York," 1860- , the predecessor of our society. "First District Dental Society," 1863- "New York Odontological Society," 1867- .

13. Series of Vol. 1 of the earliest dental periodicals.

B. W. WEINBERGER.

RECENT ACCESSIONS

Abraham, J. J. The surgeon's log.

N. Y., Dutton, 1926. 361 p.

Armstrong, C. W. The survival of the unfittest.

Lond., Daniel co., 1927. 160 p.

Avitaminosen und verwandte Krankheitszustände. Hrsg. von W. Stepp und P. György.

Berlin, Springer, 1927. 817 p.

Bainbridge, W. S. Il problema del cancro.

Roma, Pozzi, 1927. 365 p.

Banister, J. B. [et al.] The queen Charlotte's practice of obstetrics.

Lond., Churchill, 1927. 629 p.

Barker, J. E. Chronic constipation.

Lond., Murray, 1927. 503 p.

Bernard, C. An introduction to the study of experimental medicine.

N. Y., Macmillan, 1927. 226 p.

Blanton, S. & Blanton, M. G. Child guidance.

N. Y., Century co., 1927. 301 p.

Brain, W. R. Galatea, or the future of Darwinism.

Lond., Kegan Paul, [1927]. 95 p.

Browne, Sir T. The works of . . . Ed. by C. Sayle.

Edinb., Grant, 1927. 3 vols.

- Cabot, R. C. Physical diagnosis. 9. ed.
N. Y., Wood, 1927. 536 p.
- Carless, A. & Wakeley, C. P. G. Manual of surgery. 12. ed.
Lond., Baillière, 1927. 1544 p.
- Carlill, H. F. Socrates, or the emancipation of mankind.
N. Y., Dutton, 1927. 84 p.
- Clendening, L. The human body.
N. Y., Knopf, 1927. 399 p.
- Crafts, L. M. Epidemic encephalitis.
Bost., Badger, 1927. 273 p.
- Crew, F. A. E. The genetics of sexuality in animals.
Cambridge, Univ. pr., 1927. 188 p.
- Crookshank, F. G. Diagnosis: and spiritual healing.
Lond., Kagan Paul, 1927. 101 p.
- Dimmer, F. & Pillat, A. Atlas photographischer Bilder des
menschlichen Augenhintergrundes.
Leip., Deuticke, 1927. 84 plates.
- Diseases of the nose, throat and ear. 2. ed.
Bristol, Wright, 1927. 440 p.
- Driesch, H. Mind and body.
Lond., Methuen, 1927. 163 p.
- Duke-Elder, W. S. Recent advances in ophthalmology.
Lond., Churchill, 1927. 343 p.
- Falkner, H. G. Actinotherapy.
Lond., Baillière, 1927. 152 p.
- Flechsig, P. Meine myelogenetische Hirnlehre.
Berlin, Springer, 1927. 122 p.
- Fränkel, S. Die Arzneimittel-Synthese. 6. Aufl.
Berlin, Springer, 1927. 935 p.
- Fremantle, F. E. The health of the nation.
Lond., Allan, 1927. 209 p.
- Fürstenau, R., Immelmann, M. & Schültze, J. Leitfaden des
Röntgenverfahrens. 5. Aufl.
Stuttgart, F. Enke, 1927. 529 p.
- Gibson, A. G. & Collier, W. T. The methods of clinical
diagnosis.
Lond., Arnold, 1927. 398 p.
- Goodall-Copestake, B. M. The theory and practice of massage.
N. Y., Hoeber, 1927. 267 p.

- Groves, E. W. H. A synopsis of surgery. 8. ed.
Bristol, Wright, 1927. 674 p.
- Haire, N. Hymen, or the future of marriage.
Lond., Kegan Paul . . . 1927. 95 p.
- Hale-White, W. Materia medica, pharmacy, pharmacology
and therapeutics. 19. ed.
Lond., Churchill, 1927. 712 p.
- Hannan, J. H. The flushings of the menopause.
Lond., Baillière, 1927. 52 p.
- Heim de Balsac, R. Pratique cardio-vasculaire: l'atropine.
Paris, Doin, 1927. 223 p.
- Hogben, L. T. The comparative physiology of internal
secretion.
Cambridge, Univ. pr., 1927. 148 p.
- Holländer, E. Æskulap und Venus.
Berlin, Propyläen Verl., 1928. 488 p.
- Hume, E. E. Max von Pettenkofer.
N. Y., Hoeber, 1927. 142 p.
- Jamieson, J. D. H. Operative dentistry.
Edinb., Livingstone, 1927. 215 p.
- Kopeloff, N. Why infections?
N. Y., Knopf, 1926. 182 p.
- Kraepelin, E., & Lange, J. Psychiatrie. 9. Aufl.
Leip., Barth, 1927. 2 vols.
- Kretschmer, E. Der sensitive Beziehungswahn.
Berlin, Springer, 1927. 201 p.
- Lake, R. & Peters, E. A. Handbook of diseases of the ear.
5. ed.
Lond., Baillière, 1927. 310 p.
- Llewellyn, L. J. Aspects of rheumatism and gout.
Lond., Heinemann, 1927. 295 p.
- Lucas, W. R. Outwitting obesity and thinness.
Lond., Lutterworth's, [1927], 38 p.
- MacAusland, W. R. Poliomyelitis.
Phila., Lea, 1927. 402 p.
- McCoy, J. D. Applied orthodontia. 2. ed.
Phila., Lea, 1927. 322 p.
- McDougall, W. Character and the conduct of life.
Lond., Methuen, 1927. 287 p.

- Macfie, R. C. *Sunshine and health.*
N. Y., Holt, 1927. 256 p.
- McKendrick, A. *Medico-legal injuries.*
Lond., Arnold, 1927. 341 p.
- McKendrick, A. & Whittaker, C. R. *An x-ray atlas of the normal and abnormal structures of the body.* 2. ed.
Edinb., Livingstone, 1927.
- MacKenty, J. E. *Cancer of the larynx.*
[s.l.], 1927. 63 p.
- McKenzie, D. *The infancy of medicine.*
Lond., Macmillan, 1927. 421 p.
- McLester, J. S. *Nutrition and diet in health and disease.*
Phila., Saunders, 1927. 783 p.
- Martin, F. H. *South America.*
N. Y., Revell co., 1927. 435 p.
- Meldepflichtigen (Die) Berufskrankheiten. Hrsg. von F. Koelsch.
München, Lehmann, 1926. 161 p.
- Minchin, W. C. *A study in tubercle virus, polymorphism, and the treatment of tuberculosis and lupus with oleum allii.*
3. ed.
Lond., Baillière, 1927. 110 p.
- Muthu, D. C. *Pulmonary tuberculosis.* 2. ed.
Lond., Baillière, 1927. 381 p.
- Muthu, D. C. *A short account of the antiquity of Hindu medicine.* 2. ed.
Lond., Baillière, 1927. 52 p.
- O'Donovan, W. J. *Dermatological neuroses.*
Lond., Kegan Paul, 1927. 99 p.
- Oertel, H. *Outlines of pathology.*
Montreal, Renouf, 1927. 479 p.
- d'Olivet, F. *The healing of Rodolphe Grivel: congenital deaf-mute.*
N. Y., Putnam, 1927. 273 p.
- Oppenheimer, C. *Lehrbuch der Enzyme.*
Leip., Thieme, 1927. 660 p.
- Partridge, W. *Dictionary of bacteriological equivalents. French-English: German-English: Italian-English: Spanish-English.*
Lond., Baillière, 1927. 140 p.

- Pilez, A. Lehrbuch der speziellen Psychiatrie. 7. Aufl.
Leip., Deuticke, 1926. 330 p.
- Psychischen (Die) Heilmethoden. Hrsg. von. K. Birnbaum.
Leip., Thieme, 1927. 462 p.
- Radin, P. Primitive man as philosopher.
N. Y., Appleton, 1927. 402 p.
- Ray, M. B. Rheumatic diseases.
Lond., Kegan Paul, 1927. 91 p.
- Readings in urban sociology. Ed. by S. E. W. Bedford.
N. Y., Appleton, 1927. 903 p.
- Rohdenburg, G. L. Clinical laboratory procedures.
N. Y., Macmillan, 1927. 266 p.
- Rolleston, Sir H. Idiosyncrasies.
Lond., Kegan Paul, 1927. 119 p.
- Romanis, W. H. C. & Mitchiner, P. H. The science and practice of surgery.
Lond., Churchill, 1927. 2 vols.
- Russell, P. Benjamin Franklin.
N. Y., Brentano's, 1926. 332 p.
- Schilling, V. Das Blutbild.
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- Schrumpf-Pierron, P. Tobacco & physical efficiency.
N. Y., Hoeber, 1927. 134 p.
- Seligmann, S. Die magischen Heil-und Schutzmittel.
Stuttgart, Strecker, 1927. 309 p.
- Skalweit, A. Die deutsche Kriegsernährungswirtschaft.
Stuttgart, Deut. Verl.-Anst., 1927. 277 p.
- Smith, E. F. Old chemistries.
N. Y., McGraw-Hill, 1927. 89 p.
- Steiner, E. B. The eradication of leprosy from the world.
Cuttack, Orissa mission pr., 1927. 175 p.
- Stopes, M. C. Contraception. 2. ed.
Lond., Bale, 1927. 479 p.
- Stumpf, C. Die Sprachlaute.
Berlin, Springer, 1926. 419 p.
- Thom, D. A. Everyday problems of the everyday child.
N. Y., Appleton, 1927. 349 p.
- Thouless, R. H. The control of the mind.
Lond., Hodder, 1927. 203 p.

- Traguair, H. M. An introduction to clinical perimetry.
Lond., Kimpton, 1927. 264 p.
- Vesceilius, E. A. Music and health.
N. Y., Goodyear bk. shop, 1927. 120 p.
- Wilson, T. S. Tonic hardening of the colon.
Lond., Oxford pr., 1927. 210 p.
- Woollard, H. Recent advances in anatomy.
Lond., Churchill, 1927. 302 p.
- Young, J. A text-book of gynecology. 2. ed.
Lond., Black, 1927. 338 p.
- Your weight and how to control it.
N. Y., Doran, 1927. 260 p.
- Zwei grosse Naturforscher des 19. Jahrhunderts. Ein Briefwechsel zwischen Emil DuBois-Reymond und Karl Ludwig.
Leip., Barth, 1927. 240 p.
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LIBRARY DELIVERY SERVICE

A messenger service for the library has been established and in future by telephoning or writing, the Fellows may order what books they desire up to the number of five. In Manhattan and the Bronx the charge will be twenty-five cents per delivery. The same charge will be made if the messenger is sent for to return the books. The delivery service will be between the hours of nine A. M. and five P. M., every day except Sundays and holidays. To Fellows in Queens, Kings, Richmond and outside the city limits delivery will be made by express, collect, or by parcel post, with a minimum charge of twenty-five cents.

NOTES

CANDIDATES ELECTED TO FELLOWSHIP, JANUARY 5, 1923

Albert Herman Aldridge, M.D.....	33	East 68th St.
Louis Simon Aronson, M.D.....	268	West 91st St.
Edward Arthur Bullard, M.D.....	47	East 57th St.
Meredith Fairfax Campbell, M.D.....	33	East 68th St.
Charles Goodliffe Darlington, M.D.....	124	West 79th St.
Waldo Beattie Farnum, M.D.....	33	East 68th St.
Hermann Feit, M.D.....	30	East 40th St.
Monroe Edwin Greenberger, M.D.....	129	West 46th St.
Paul Gross, M.D.....	1129	Madison Ave.
Gerald Harrison Grout, M.D.....	121	East 60th St.
James Swift Hanley, M.D.....	40	West 55th St.
Wendell Lochhead Hughes, M.D.....	170	East 95th St.
Robert LeRoy Hutton, M.D.....	101	East 74th St.
Harry George Jacobi, M.D.....	119	East 84th St.
William Lloyd James, M.D.,		

328 Undercliff Ave., Edgewater, N. J.

John Joseph Honan Keating, M.D.....	111	East 75th St.
George Bolling Lee, M.D.....	20	East 66th St.
Aubrey B. MacLean, M.D.....	106	East 60th St.
Eugene Ernest Marcovici, M.D.....	485	Park Ave.
Thomas Andrew Northcott, M.D.....	17	East 38th St.
Maurice M. Pomeranz, M.D.....	911	Park Avenue
Beverly Chew Smith, M.D.....	130	East 56th St.
Mortimer Dudley Speiser, M.D.....	224	East 17th St.
Walker Ely Swift, M.D.....	164	East 72nd St.
Martin G. Vorhaus, M.D.....	50	Central Park West
David Paul Waldman, M.D.....	1050	Park Ave.
Benjamin Philip Watson, M.D.....	1125	Fifth Ave.
William Louis Wheeler, M.D.....	348	West 22nd St.
McIver Woody, M.D..	405	Westminster Ave., Elizabeth, N. J.
Peter Yudkowsky, M.D.....	514	West End Ave.

And for Associate Fellowship

Edith Mulhall Achilles, Ph.D.....	4	East 95th St.
Robert Chambers, Ph.D.....	1060	Park Ave.
Harry H. Sobotka, Ph.D.....	405	East 58th St.
Gladys Griffith Tallman, A.M.....	780	Riverside Drive

BEQUESTS AND LEGACIES

During the last three years the Academy has been fortunate in having been mentioned in the wills of a considerable number of Fellows.

It received a legacy of \$5,000 from the late Edward B. Bronson, in 1926, the income of which was to be used for the general purposes of the Library.

During 1927 it received a large legacy from the late Dr. Walter B. James, of \$25,000, the income to be used for the general purposes of the Academy.

The officers and Trustees of the Academy have been consulted in regard to proposed bequests on several occasions during the recent years. A lawyer, in behalf of a client, asked the Trustees if the Academy would accept a bequest amounting to approximately \$250,000, the income to be applied to advance medical research in medical schools, hospitals and laboratories. The prospective legator desired to provide in his will that no grant should be made to any individual of a religious faith specified by him, nor to any institution which was under the control of individuals of a certain religious faith. The lawyer in question was advised by the Trustees that the Academy would not accept a bequest under such conditions.

The Academy has been offered an endowed lectureship, the income of which would be a relatively small amount, for the purpose of giving an annual lecture on one of the specialties of medicine, which would carry the name of a physician formerly of New York City. The Trustees, however, felt that it would be wiser not to accept such an offer.

A bequest for a lectureship was declined by the Trustees because the sum of money was not large enough, and the name of the lectureship was not sufficiently important to warrant the Trustees to accept this responsibility.

A third bequest has been made to the Academy for the purpose of giving an annual lecture, and the amount of money bequeathed is sufficient for this purpose, but it is specified in the will that the lecture and the topic of the lecture should be specified by an association having its headquarters outside of New

York City. The Trustees declined to accept this bequest on the ground that it was improper to call a special meeting of the Academy, if the topic and the lecturer were to be selected by any other agency than the Academy itself.

There are several other wills in regard to which either the officers or the Trustees of the Academy have been consulted, which provide for lectureships, but in which such restrictions as have been made, are entirely satisfactory to the Trustees.

The Academy has, at the present time, a large annual expenditure, nearly three-quarters of which is defrayed by income from endowment. It is, however, in continued need of additional funds, and the largest item of its budget is for the maintenance of the Library.

The City of New York is the largest medical center in the world. It has the largest number of practicing physicians, the greatest hospital facilities, maintains five medical schools and should have the most useful Library to meet the needs of the physicians and the public, which should offer the most modern facilities for bibliography, reference and photostat work and which should maintain a delivery service. There may be a need of several small reading rooms in other parts of the city.*

The collection of classics and incunabula should be constantly added to, and the possibility of a research division of the Library should be given serious consideration.

The Academy has accumulated a fairly large collection of engravings, etchings and mezzotints of physicians and scientists. It is rare, however, to find one made within the past fifty years as photography has replaced these older arts. Fellows of the Academy are urged to leave to the Academy any photographs they may have of older or contemporary physicians and scientists and also to give to the Academy one of their own.

It may well be that some of the Fellows will think favorably of remembering the Academy in their wills. The Council and Trustees, therefore, express the hope that Fellows of the Academy and their friends, who desire to leave bequests in their wills.

*See report on Needs of the Library, BULLETIN No. 6, second series, Volume II, June, 1926.

in favor of the Academy, will either have sufficient confidence to leave it to the Academy unrestricted or that they will consult with any of the officers or Trustees as to whether or not a certain restriction as to the use of their money would be acceptable to the Academy.

ANNOUNCEMENT

The Trustees have made arrangements to have lunches served daily. A cook is employed by the Academy and the members of the staff pay a small sum to cover the cost of food. This action was taken chiefly for the convenience of the members of the staff, but Fellows may have lunches served in the Reception Room at a cost of 50 cents. Any Fellow desiring lunch should notify the Academy telephone operator.

DEATHS OF FELLOWS

CALVIN THAYER ADAMS, M.D., Sound Beach, Connecticut: graduated in medicine from the College of Physicians and Surgeons, New York City, in 1884; elected a Fellow of the Academy April 4, 1889; died January 4, 1928. Dr. Adams was a member of the Obstetrical Society and of the Alumni Association of New York Hospital.

CHARLES MILBANK CAULDWELL, M.D., 59 West 46th Street, New York City; graduated in medicine from the College of Physicians and Surgeons, New York City, in 1879; elected a Fellow of the Academy January 3, 1884; died January 17, 1928. Dr. Cauldwell was a Fellow of the American Medical Association, a member of the National Tuberculosis Association, and Consulting Physician to the St. Francis and St. Joseph Hospitals, and Stony Wold Sanatorium.

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BULLETIN OF THE NEW YORK ACADEMY OF MEDICINE

VOL. IV.

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No. 3

PAPERS DELIVERED AT STATED MEETINGS

Symposium: Malaria in Syphilis

December 1, 1927

I.

THE PLACE OF MALARIA IN THE TREATMENT OF GENERAL PARALYSIS

A SURVEY OF FOUR AND ONE-HALF YEARS' EXPERIENCE IN THE USE OF THIS MODE OF THERAPY*

HENRY A. BUNKER, JR., and GEORGE H. KIRBY

The non-specific treatment of neurosyphilis, developed during the past ten years by the Vienna School under the leadership of Wagner-Jauregg, has marked, according to the opinion of many physicians, one of the most notable advances in the field of modern therapeutics. The fact that Wagner-Jauregg was recently awarded the Nobel Prize in Medicine is further evidence of the scientific value set upon his work.

As is well known, the Viennese psychiatrist, after experimenting with various fever-producing vaccines and infections, came to the conclusion that tertian malaria yielded by far the best results in the treatment of the parenchymatous form of neurosyphilis—particularly general paralysis.

Our experience with the malaria treatment began in May, 1923, when we inoculated our first cases of general paralysis. During the past four and one-half years there has been treated at the Psychiatric Institute a total of 251 patients—166 men and 85 women.

*From the New York State Psychiatric Institute, Ward's Island, N. Y.

These have included cases of general paralysis in practically all stages of the disease, the patients with few exceptions having been committed because of their mental disorder to the Manhattan State Hospital. Through the coöperation of the Superintendent of the Hospital, the patients were transferred directly for treatment to the clinical service of the Psychiatric Institute.

The present report will deal only with the male cases, which naturally constitute a major portion of our material. Because the treatment of the female cases was begun at a later period and also because they present certain special features of clinical interest, a report on them will be reserved for a future communication. We further confine this report to a consideration of cases of general paralysis treated almost exclusively by malaria alone; we thus avoid the complicating questions which must arise when various other remedies are used in combination with malaria or supplementary to it.

An inquiry into the place which the malaria treatment occupies or ought to occupy in the therapeutic management of general paralysis might reasonably resolve itself into three questions of immediate practical interest. These three questions are:

- (1) What are the clinical results which the malaria treatment is capable of effecting in general paralysis?
- (2) What are the disadvantages and drawbacks, and in particular the dangers, inherent in this form of treatment?
- (3) What is the duration of the remission of mental symptoms obtained in the cases that respond favorably to malaria treatment—in other words, is the beneficial result a lasting or permanent one?

In attempting to answer the first question, we may cite our experience in the treatment of 156 male patients who completed a course of fever therapy between the dates of June 1, 1923, and August 1, 1927—these 156 patients representing unselected cases in all stages of the disease, with a history of definite mental symptoms antedating admission to the hospital by a period of one month up to three years.

TABLE 1
Clinical Outcome in 156 Male Patients
Treated between June 1, 1923 and August 1, 1927.

		Per Cent.	
Full Remissions	52	33.3	} 50.6
Well-marked Mental Improvement.....	26	17.3	
Unimproved, or temporary improvement only	37	23.7	} 49.4
Died	40	25.7	
(Lost sight of)	1		
Total	156	100.0	

The results so far obtained in this group of patients are presented in Table 1. In our experience, almost the entire degree of mental improvement which can be obtained in the given case is apparent in the vast majority of instances within three months from the completion of the course of fever. It will be noted, therefore, that since even the most recently treated patients in the present group completed their fever therapy four to six months ago, a provisional idea is permissible even in these regarding the character of their response to the treatment.

As is evident from Table 1, one-third of all our patients achieved a complete remission of mental symptoms; they gained good insight, were free from defect symptoms and have been discharged from the hospital and have returned to work. In a few instances, the persistence of residual of a relatively minor character has been sufficient to prevent the patient from resuming his former type of occupation and hence from exhibiting the full degree of his former economic efficiency; but in the great majority of cases these residual symptoms either have been entirely absent or have been so slight or of such a character as not to militate against resumption of the patient's former place in the community.

At this point a word might be said about the occurrence of so-called spontaneous remissions in general paralysis. As is well known, remissions of varying duration occur in cases without the employment of specific or other modes of treatment. The frequency and duration of such remissions has become a matter of considerable interest since the introduction of the newer methods of treatment of general paralysis. The two most careful studies which we have on this subject are those of Tophoff and Raynor. Their results, as shown in Table 2, indicate that spontaneous remissions may be expected to occur in from about 4 to 5 per cent. of hospitalized cases of general paralysis.

TABLE 2

Spontaneous Remissions in General Paralysis

Tophoff—290 untreated cases in State Hos- (1924) pital, Bremen (Germany) 1908- 1922. Complete remissions occur- red in	4.8 per cent.
Raynor—1,004 untreated cases in Manhat- (1924) tan State Hospital 1911-1918. Complete remissions occurred in	3.5 per cent.

Among the so-called mentally improved cases (Table 1) we have included all those who seemed to us to exhibit a definite and unmistakable degree of mental improvement, but in whom either the improvement fell short of what it might have been, or there remained evidence of brain destruction sufficient to preclude the patient's being self-supporting or able to cope with any but the simplest type of environment. As will be observed from Table 1, almost exactly one-half of the total of 156 patients manifested a definite response to the treatment in the form of an abolition of most or of all of their mental symptoms; one feels that the differences within this group of 50.6 per cent. represent differences in the degree of functional restitution, possibly, rather than differences with respect to the efficacy of the therapeutics *per se*.

The unimproved cases are obviously those in whom little or no improvement took place in their mental condition, so that to all intents and purposes they might as well not have undergone the treatment; in addition we have placed in the unimproved group those cases in whom an improvement, although quite definite, was of very brief duration, such as a few weeks or perhaps two or three months.

The percentage of deaths as it appears in Table 1 might at first sight seem rather large. But it must be borne in mind that general paralysis is a disease which results in death within three years in the overwhelming majority of cases. In this connection we may cite the statistics of the New York State Hospitals. These figures (Table 3) show the extreme malignancy of untreated general paralysis: Of 737 cases terminating fatally during 1920, 63 per cent. died during the first year of hospitalization.

TABLE 3

Deaths in Untreated General Paralysis in the
New York State Hospitals

Number of paretics dying (1920) in State Hospitals before present treatment methods introduced....	737
Number dying (1920) within 12 months after admission	468
Paretics dying within 12 months after admission...	63%

It is perhaps not surprising, therefore, nor in any way discouraging, that death should be the outcome in 25 per cent. of a group of patients observed for an *average* period of very close to two years and a half. It should be said at once, however, that only half of the number of deaths shown in Table 1 were due directly to general paralysis itself, these deaths having taken place at intervals subsequent to the completion of the course of malaria ranging from three months to three years and one month. It should be noted also that a definite degree of mental improvement actually took place in a few patients who eventually died; and it is therefore interesting to note that in almost all of these patients death took place with relative suddenness.

that is, without a protracted period of physical and mental retrogression. The remaining one-half of the patients who died are those in whom general paralysis itself was not the direct cause of death; these cases died during the course of fever therapy or within two weeks of its termination; hence it may be assumed that the malaria itself was the direct or indirect cause of their demise. From a careful analysis of our material, we feel that it can be safely stated that the deaths in 12½ per cent. of the cases were more or less directly associated with the malaria fever itself. This matter brings us to the second question—the drawbacks and dangers inherent in the malaria treatment.

The drawbacks to the malaria treatment are principally those which arise from certain difficulties in maintaining the malarial organism in an active state for transmission to new patients as they present themselves for treatment. Since it is next to impossible to keep the plasmodium alive in an artificial culture medium, it is necessary to carry the malarial blood directly from donor to recipient in an unbroken sequence; for which reason it is indispensable that the supply of candidates for treatment should be sufficiently numerous to make this consecutively possible. Clearly, no escape from this difficulty is practicable unless one substitutes for the malarial plasmodium an organism which can be kept alive in laboratory animals, such as, for example, the spirillum of relapsing fever or the spirochæte of rat-bite fever.

A somewhat analogous difficulty is that which arises from the fact that certain patients seem to possess at least a partial degree of immunity to malaria, if we may make such an inference from the observation that in a noticeable proportion of patients (perhaps roughly one in six) the clinical manifestations of the infection spontaneously cease to appear after one or two up to as many as six or eight febrile paroxysms. In still other patients, although these are somewhat exceptional on the whole, it appears impossible to produce malarial infection at all, even after

repeated inoculations with blood which transmits the infection successfully to patients inoculated simultaneously; and we might add that in our experience it has been all but impossible to produce malarial infection in negro subjects. In these less susceptible individuals it is obvious that fever may be produced instead by means of vaccines or relapsing fever or rat-bite fever.

The question of malaria as a direct or indirect cause of death is a much more difficult and troublesome one, and is not made less so even by the realization that general paralysis is ordinarily an inevitably fatal disease, so that the Hippocratic aphorism, "for extreme diseases, extreme methods of cure," is applicable to it with peculiar aptness. And there is moreover the question of the use of malaria in that other and non-fatal form of parenchymatous neurosyphilis, *tabes dorsalis*. Yet certainly benign tertian malaria does not rank as a cause of death of any importance in those regions of this country in which malaria is endemic.

It has seemed to us that several factors may be operative in causing malaria to end fatally in a higher percentage of patients with general paralysis than would ever under ordinary circumstances be the case. The first among these considerations is the fact that many patients with general paralysis, especially at the stage of advancement to which they have progressed at the time of admission to a state hospital, are considerably under par physically, often having lost an appreciable amount of weight, and giving evidence of having suffered for a year or more previously from a systemic disease. Secondly, an appreciable proportion of our patients are well past the age of 40 when they receive treatment, whereas those who acquire malaria in a region where the disease is endemic would on the whole be more likely to have their first attack at a considerably earlier age. It is a fact that our young patients, almost without exception, have seemed to experience no difficulty in coping with the malarial infection; on the other hand, we have had several patients well past the age of 50 in whom no untoward results have

occurred. Thirdly, it appears to be a well-established fact that a very definite proportion of patients with general paralysis have syphilitic lesions of the aorta, even though these are not demonstrable clinically through signs or symptoms; and it is therefore conceivable that this complication may possibly play some part in the inability of certain individuals to survive the course of fever therapy.

These considerations, which are mere possibilities, would seem to indicate that we lack any very concrete idea of the exact nature of the cause of death in these fatal cases.* At all events, Dreyfus of the Frankfurt Clinic has claimed that by interrupting the febrile attacks by giving small doses of quinine he was able to carry through more than 130 patients, mostly tabetics, with only a single death in the entire series. Since almost without exception in our own cases the febrile paroxysms have occurred at daily intervals instead of every other day, we have recently adopted a similar technique of spacing

*The question of the cause of death in malaria has been dealt with in several recent papers in the foreign literature. Seyfarth, for example, found heart affection the cause in 14 per cent.—with coronary blockage, myocarditis, heart muscle necrosis and fatty degeneration. Malarial septicemia accounted for death in 30 per cent. Cerebral cases numbered 55 per cent., the brain showing massing of parasites in the brain capillaries, punctiform hemorrhages, granulomata, and parasitic emboli. Seyfarth, however, was dealing with severe infections of the so-called algid or typhoidal type.

Hoffmann has reported evidences of blood-vessel paresis or paralysis, such as a small monocrotic pulse, pale skin, cyanosis, cold sweat, and pulmonary oedema. He found caffeine useful in combating this condition; and in common with others, we have used caffeine routinely in all our cases from the time of onset of the febrile paroxysms.

Several French writers have reported all grades of degenerative change in the adrenals in fatal cases of malaria, and Paisseau and Lemaire consider the adrenals and the nervous system the most vulnerable organs of the body to malaria.

Anderson believes that since the features of the cold stage of the malarial paroxysm are practically identical with sympathetic adrenal stimulation, the inference is that repeated malarial attacks in rapid tertian succession put a heavy strain upon the sympathetic-adrenal apparatus with various grades of exhaustion of this apparatus as a consequence—and this, indeed, is borne out by autopsy, he states, so far as the adrenals themselves are concerned.

out the attacks, but we cannot as yet say whether or not patients withstand malaria more successfully by reason of these longer intervals of rest and recuperation between attacks, as it might perhaps be reasonable to expect they should.

The third question which we set out to discuss, namely, the permanence of the results which the malaria treatment is capable of producing, can only be answered at present in a provisional sense, for obviously a period of at least ten years must elapse before we can speak of a cure in any strict sense of the word, or before we can even be certain that the clinical remissions induced by malaria are anything more than simply remissions of greater duration than those that occur spontaneously or as a result of other causes.

In the meantime, we may consider briefly the first 34 patients treated by us—those who underwent a course of malaria during the first year of our experience with the treatment, between June 1, 1923, and June 1, 1924; in other words, those who completed treatment between three and one-half and four and one-half years ago.

As indicated in Table 4, three of these patients died during their course of fever. A fourth died of a series of

TABLE 4

The Present Status of 34 Patients Treated More Than Three and One-Half Years Ago
(between June 1, 1923, and June 1, 1924).

Died during malaria	4
Died 2 months after malaria	1
Died of general paralysis 6 months to 3 years after malaria	4
Suicide 8 months after malaria	1
	— 10
Unimproved and now worse	1
Unimproved and stationary	5
Improved and stationary	2
Full remission with later relapse (after 2 yrs. and 3¼ yrs.)	2
Full remissions persisting to date	14
	<u>34</u>

convulsions one week after his final attack of malaria. A fifth patient died two months after completing his course of fever, and whereas he apparently died of general paralysis, we felt that the malaria had done something to hasten his end. Thus, 29 of these 34 patients were alive three months after the completion of their course of fever. Of these 29, five have since died—one patient six months after treatment, one one year and a half, one two years and a half and one three years and one month subsequent to treatment. The fifth patient, after achieving a relatively satisfactory remission, became depressed and suddenly committed suicide after completing treatment. Hence, subtracting these ten deaths, we have 24 patients still living out of the 34 who completed treatment three and one-half to four and one-half years ago.

Of these 24 patients, six were originally classified as unimproved. They remain unimproved, and five of them have shown no definite evidence of further physical or mental deterioration up to the present time. Though the practical value of such an outcome is nil, it would nevertheless seem as though the malaria treatment had actually arrested the disease process in these patients or at least in some of them, even though at a stage where any degree of functional restitution was no longer possible.

Two other patients, originally classified as moderately improved, continue to maintain this status at the end of three years and one-half and three years and three-quarters, respectively.

Sixteen of these patients achieved a complete remission and were discharged from the hospital, but have been kept under observation ever since. Fourteen of these 16 patients have shown no evidence whatever of receding from the maximum status which they attained following the malaria treatment; in other words, their state of complete clinical remission has not only continued unmodified over an interval of three and one-half to four and

one-half years, but shows no present signs in any of these patients of doing otherwise.

Of the 16 patients originally considered to have attained a complete remission, only two have suffered a partial relapse, with return of some of their previous mental symptoms in a relatively mild and modified form; the relapse occurred in one patient after two years, and in the other three years and three months subsequent to treatment. One of these patients regained to a fairly complete degree his previous status at the end of about six months, and this without any further treatment. The other patient regained to a partial degree his previous status, after a second course of malaria and two courses of tryparsamide of twelve injections each. It might be stated at this point that except for the last named case and two others, none of the patients here reported received any other form of anti-syphilitic therapy, so that the results here presented are almost without exception those obtained by means of malaria treatment alone.

It is rather noteworthy, perhaps, that relapse did not take place in either of these two cases until at least two years had elapsed since treatment; and this does something to confirm our previous impression that the more complete the degree of clinical improvement obtained in these patients, the longer is that improvement likely to last.

At all events, the outstanding fact to which we would call attention is, not only that complete remissions have occurred in about one-third of our total number of cases, but that in 14 out of 16 cases the remission has been maintained unmodified for a space of at least three and one-half to four and one-half years.

There are two further points which are of a certain interest in connection with the results obtainable from the malaria treatment; namely, the type of patient most likely to respond in a favorable manner, and the influence of the treatment upon the spinal fluid findings.

TABLE 5
Therapeutic Outcome in Relation to Clinical Type
(in 84 cases)

	Simple Dementing	Expansive	Manic
Unimproved or Died.....	33	6	0
Definitely Improved	8	3	4
Full Remissions	7	11	12
	—	—	—
Total	48	20	16

Table 5 illustrates the relation between therapeutic outcome and the clinical type of the disease as we have observed it in 84 patients who survived the period of treatment by more than three months. As may be noted, only one-seventh, or 14 per cent., of the 84 patients of the simple dementing type achieved a good remission, whereas three-quarters, or 75 per cent., of the 16 patients of the "manic" or hyperactive type did so.

As to the influence of the malaria treatment upon the spinal fluid findings, especially the Wassermann reaction in the spinal fluid, Table 6 illustrates our experience with 47 patients who have now been followed for at least two and one-half years, and who have received no other anti-syphilitic treatment subsequent to malaria. It will be observed that the malaria treatment has had little or no influence upon the Wassermann reaction in the spinal

TABLE 6
Influence of the Malaria Treatment
Upon the Wassermann Reaction in the Spinal Fluid

Spinal Fluid Wassermann	Number of cases	Per Cent.	
Unchanged	19	40	} 55
Modified (negative with 0.2 cc.).....	7	15	
Much modified (negative with 0.5 cc.)..	11	24	} 45
Negative (with 1.0 cc.)	10	21	
Total	47	100	

fluid in a little more than one-half these patients, and this irrespective of the clinical outcome. But what is truly striking is that in a little over one-fifth of these cases of general paralysis, the reaction in the spinal fluid has become *completely negative* following upon treatment with malaria alone. This observation has impressed us very strongly, in view of the fact that as regards the spinal fluid general paralysis is the Wassermann-fast condition *par excellence*.

Table 7 presents the clinical outcome as compared with the Wassermann results in these same 47 patients. The lack of parallelism between the two is rather clearly suggested by the fact that in each of the serological groups the number of remissions does not differ very essentially from the number of those in whom only moderate mental improvement or none at all took place.

TABLE 7

Serological Results as Compared with Clinical Results

Spinal Fluid Wassermann	Moderate or no mental improvement	Good Remissions
Essentially unchanged	10	9
Modified	3	4
Much modified	6	5
Negative	4	6
	—	—
	23	24
		47

Table 8 indicates the lapse of time required for the malaria treatment to exert its influence on the spinal fluid in those 28 cases in which the strength of the Wassermann

TABLE 8

Interval Between Completion of Treatment and
Modification of Spinal Fluid Wassermann
Reaction

Interval subsequent to malaria necessary to attain degree of modi- fication now present	Much			Total
	Modified	Modified	Negative	
One year	3	2	1	6
One and one-half years	1	4	2	7
Two years and over	3	5	7	15
	<hr/> 7	<hr/> 11	<hr/> 10	<hr/> 28

reaction in the spinal fluid become modified subsequent to treatment (Table 6). Clearly, two years is more or less the minimum interval required by rather the majority of cases to attain at least the higher degrees of modification.

A final word about the influence of malaria on the pathological process in the brain in cases of general paralysis. Dr. Ferraro, of the Institute staff, has undertaken a study of this question on a series of 30 brains of patients who died during or after the fever treatment. This study has shown that the inflammatory exudate in the brain is frequently reduced in amount, and in association with this there is also a reduction in the neuroglia reaction. One is, therefore, justified in saying that in many of the brains studied, the microscopic picture shows a marked recession of the pathological process, a finding which can be regarded as evidence of healing in the sense that the inflammatory reaction becomes less active and tends to subside. Tissue that has been destroyed can of course not be restored.

In conclusion we should like to emphasize once again the fact that the patients dealt with in this communication were, almost without exception, definitely psychotic at the time they came under our care; that is, they exhibited outspoken mental symptoms such as necessitated their commitment to an institution for the insane. We

can scarcely help thinking, therefore, that the considerably earlier treatment of these patients would have produced a notably larger proportion of therapeutic results of the maximum order; it is certainly conceivable, for example, that irreparable cerebral damage might have been forestalled by more timely treatment in at least some of these patients, and that many of those who manifested definite mental improvement might thus have been brought within the group of full remissions. It is for this reason that we urge the treatment of these patients before outspoken mental symptoms have announced their presence; and we believe that for this purpose advantage should be taken of a form of treatment now shown to be remarkably effective against a disease which has largely resisted the therapeutic methods of the past. To continue to use the ordinary anti-syphilitic remedies once it appears probable that the patient is suffering from neurosyphilis of the parenchymatous type, is in our opinion a waste of time and opportunity.

SUMMARY

1. Of 156 male patients with general paralysis who received the malaria treatment between June 1, 1923, and August 1, 1927, at least 50 per cent. manifested a definitely favorable response, even though in one-third of these latter residual evidences of previous cerebral tissue destruction precluded full recovery in a clinical sense.

2. In this group, observed over an *average* period of two and one-half years, the death rate due to general paralysis has been 12.5 per cent.; based on the averaged expectation of life of 1.5 year exhibited by untreated general paralytics in the New York State Hospitals, the death rate in the present group would have been at least 65 per cent.

3. Of 34 patients treated more than three and one-half years ago (prior to June 1, 1924), 29 were alive three months after the completion of their course of fever; of these 29, 5 have since died, 6 are unimproved (although

only one of these has definitely retrogressed), 2 have remained moderately improved, and 16 attained full remissions, in 14 of whom their state of complete clinical remission has thus far continued unaltered.

4. In a group of 84 cases, 12 out of 16 patients of the "manic" or hyperactive type achieved full remissions, as compared with 11 out of 20 of the expansive type but only 7 out of 48 of the simple dementing type who did so.

5. In a group of 47 patients followed for at least two years and one-half, the malaria treatment had little or no influence upon the strength of the Wassermann reaction in the spinal fluid in 26 (55 per cent.). But in 10 patients (21 per cent.) the Wassermann reaction has become *completely negative* (to 1.0 c.c. of spinal fluid) following upon treatment with malaria alone.

6. Two years was more or less the minimum period of time required by the majority of cases to attain at least the higher degrees of modification of the Wassermann reaction in the spinal fluid.

7. Since advantage can now be taken of a form of treatment demonstrably effective against a disease which has largely resisted the therapeutic methods of the past, the early recognition of neurosyphilis of the parenchymatous type becomes mandatory.

II.

CLINICAL RESULTS FOLLOWING MALARIAL THERAPY IN GENERAL PARESIS

CHARLES W. STONE

Cleveland

Since the early reports of Wagner von Jauregg on the treatment of general paresis by malarial inoculation, nothing in our therapeutic armamentarium against this disease has created an equal degree of interest. Contributions to

the published literature on this subject have been numerous both at home and abroad. The results reported have varied, but, in general, the earlier reports were enthusiastic, and the more recent ones somewhat more guarded, although still of a favorable character. Several proposed hypotheses have been suggested regarding the mode of action of the malarial and kindred inoculations in general paresis, but, as yet, no generally accepted explanation of the favorable results obtained is available.

On the neuropsychiatric service of Cleveland City Hospital this form of therapy has been studied for the past three years. This service runs upwards of one thousand new psychiatric admissions of various forms of mental disorder per annum. As this psychopathic hospital is intended for the diagnosis and care of acute mental disorders, it receives to a considerable extent the earlier manifestations of mental disease. In most of the cases of general paresis in this series, the acute mental symptoms had developed recently, although a careful history of the individual patient frequently elicited a previous gradual change in personality extending back over months or even years. However, from the standpoint of hospital patients, this group comprises as early forms of general paresis as may be expected to be encountered. The period of observation of these patients in our own hospital averaged between three and four months. Those patients requiring longer periods of hospital supervision were transferred to the Cleveland State Hospital. Through the coöperation of the social service section of our psychopathic hospital, and through the courtesy of the superintendent of the Cleveland State Hospital, we have been enabled to maintain a limited follow-up of our cases, whether they went to their homes or received further institutional care.

At this time we report upon 151 cases of general paresis who have been given malarial inoculations and have responded with typical paroxysms. The results upon the first 101 cases have been reported previously.* This former

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report is supplemented by the results observed on an additional 50 cases similarly treated in the past year. The diagnosis of general paresis was made on the basis of the accepted physical signs and mental symptoms of this disease, and in all instances was corroborated by serologic examination of the blood and spinal fluid, and the determination of the cellular and globulin content and the colloidal reaction of the spinal fluid. The ages of the patients inoculated ranged from twenty-four to sixty years; under thirty years there were 14 cases; from thirty-one to forty years were 56 cases, from forty-one to fifty years were 61 cases, and from fifty-one to sixty years were 20 cases. Males numbered 128, and females 23.

The strain of malarial plasmodium used throughout the series was obtained originally from a patient with naturally acquired malaria who was on the medical service of the Cleveland City Hospital. Blood smears showed the presence of two chronological groups of parasites of the double tertian type. Inoculation was made directly from patient to patient, usually with from 5 to 10 c.c. of blood. When made intravenously (the method of choice), as was done in 93 cases, the incubation period was about four and a half days; when made subcutaneously, as was done in 58 cases, the incubation period was about ten days. The number of paroxysms averaged twelve for the entire series. Some patients withstood the malaria much better than others, so the number of paroxysms produced was a purely individual problem. In some cases marked weakness, anemia or slight jaundice developed after a varying number of paroxysms, and such factors aided in the decision as to when the malaria should be terminated by the administration of quinine. Determinations of the blood urea were closely followed, because experience showed that an increase to 80 mgm. or more per 100 c.c. of blood was an indication for the cessation of the paroxysms. Likewise blood pressure readings sometimes provided useful indications for the limitation of the malarial chills. In general, after the onset of malarial paroxysms the trend of the blood pressure is downward, although with individual

paroxysms there may be a temporary rise. A decided fall in blood pressure from its original level, accompanied by signs of physical weakness or threatened collapse, naturally suggests the desirability of terminating the malaria.

In this series, before malarial inoculation, the Wassermann reaction on the blood was positive, and on the spinal fluid was positive or anticomplementary; after the malarial therapy, no marked effect upon these reactions was observed, although we have two recent reports on former patients, one from a family physician and one from a hospital, of negative Wassermann reactions on the blood. After malarial therapy the cellular content of the spinal fluid usually has diminished, and in some instances has come within normal limits. The globulin content of the spinal fluid has likewise diminished as a rule, and frequently the colloidal reaction has shown some lowering of the curve. In the cases where improvement has occurred to the extent that the patients have resumed work, the cell count of the spinal fluid has been reduced generally to 10 or less per c.mm.; the globulin to a trace; and the colloidal curve has become less pronounced, being reduced from the paretic to the luetic (tabetic) zone. There has been no constant parallelism between these changes in cellular and globulin content and colloidal reaction. In some instances there was a tendency of these reactions to return to their former levels. This seemed particularly true in those cases which have not shown clinical improvement. Such cases have shown some diminution in cell count and globulin content within a month after malarial inoculation, with at least a partial return to their former levels within the succeeding one or two months. The colloidal curve has shown a tendency to become less pronounced than before malarial inoculation, but this has not been so marked as in the cases which have shown clinical improvement. These changes in the spinal fluid, therefore, may be of some value, along with other evidences of improvement, in estimating the prognosis in individual cases.

During the period of malarial paroxysms and immediately thereafter, the general resistance of many paretics is much lowered, as is evidenced by the fact that at this time the patients are particularly susceptible to the development of various forms of infection of the skin and subcutaneous tissue, ranging from localized furuncles to extensive fatal cellulitis, and of pulmonary infections such as bronchopneumonia.

In a few instances after malarial inoculation, some improvement has been noted in the speech, and some diminution observed in the tremor of the face and tongue, together with some lessening in the activity of the deep reflexes. In only one instance have pupillary disturbances disappeared, and this did not take place for many months, during which time active antiluetic treatment was given.

The extent and degree of improvement in the mental state of patients may be inferred from the fact that of the 151 so treated 77 have returned home, and of these at least 34 are working steadily; 47 others are still (November 1st, 1927) in the Cleveland State Hospital. Of these 47 cases, 6 are showing improvement, 24 show no change and 17 are growing worse.

The remaining 27 cases have died. Six deaths followed the development of extensive cellulitis; 5 deaths were from bronchopneumonia and one was from empyema; two died following apoplectiform seizures which occurred during the period of malarial paroxysms (both of these patients had had previous convulsive seizures); one died with signs of exhaustion and emaciation shortly after the termination of his malarial paroxysms; 12 deaths occurred months after the malarial therapy was concluded, and were due directly to the general paresis. It is evident that the malaria *per se* should not be held as the direct cause of the deaths in this series (with one possible exception), yet, through lowering the resistance of certain patients, already diseased, to other infections, it served as an active contributing factor in some of the deaths. It is of interest to note that in the last 50 cases treated there have been but

three deaths. One of these deaths was the empyema noted above; one was from bronchopneumonia; and one occurred in an individual who showed a poor response to the malaria, and had a spontaneous cessation of paroxysms after six chills. He was transferred to the Cleveland State Hospital where death later took place. Three deaths among 50 cases compare most favorably with the 24 deaths among the previous 101 cases. The explanation, we believe, is largely dependent upon two factors: First, a careful selection of the patients to whom the malaria should be given; all paretics otherwise diseased were excluded; only those were selected who appeared strong and reasonably well nourished. Second, a careful individual nursing service during the period of paroxysms and for a couple of weeks thereafter; this is of importance in the agitated form of paresis because it is this group of patients who are so likely in their excitement to acquire abrasions of the skin which later may develop into serious infections, or who from undue exposure may contract pneumonia; and it is likewise important for the inactive parietic because it provides a means of better maintaining his resistance through adequate food and general bodily care.

COMMENT

Twenty-three of the last 50 cases inoculated with malaria also were given tryparsamide. We have been disappointed in finding no appreciable difference in the physical condition, the neurological signs, the mental symptoms and the changes in the blood and spinal fluid in this group when compared with the 27 other cases not given this combined therapy.

After malarial inoculation, in our experience, favorable results may develop gradually over a period of several months. If such results are not observed within six months, a reinoculation with malaria may be considered. We have observed several instances of marked improvement following such reinoculation. This would seem particularly applicable in those cases which show decided

improvement in their physical condition after malarial therapy without a corresponding change in their mental condition.

After malarial inoculation, a maniacal parietic may quiet down to such an extent as to become an easily handled institutional case, even though the mental state does not clear up sufficiently to warrant his return to his home.

In our series we have no evidence that general paresis has been cured by malarial inoculation, even though there is good evidence of marked improvement having taken place in a large percentage of the cases. Accordingly, it is natural to expect some relapses of the mental condition to occur. We have had 5 instances of such relapse which has necessitated resumption of hospital care.

SUMMARY

In a series of 151 cases of general paresis treated by malarial inoculation, and observed for a sufficient period of time to permit drawing conclusions concerning the results, 27 have died, 77 have improved sufficiently to live at home, and of these 34 are working steadily; 6 have improved but still require institutional care; 24 show no improvement, and among these are 5 who have improved and later relapsed; and 17 are progressively growing worse.

CONCLUSIONS

After malarial inoculation in general paresis, the percentage of patients showing improvement, conservatively estimated, is sufficiently high to warrant consideration of this method as a form of therapy in this disease. It is to be hoped, however, that malarial inoculation against paresis may serve as a step in the development of a more satisfactory form of therapy with a less empirical basis. The mortality rate encountered indicates that the malarial treatment of general paresis cannot be undertaken lightly. Malaria lowers the resistance of patients, already diseased, to other forms of infection. This fact should suggest the

desirability of exercising a careful selection of the cases to whom this form of treatment may be administered. Improved nursing care for patients given malarial inoculation is important as a means of lowering present mortality records. Favorable results after the use of this form of therapy may not be seen for several months.

III.

EXPERIENCES WITH MALARIAL INOCULATION IN SYPHILIS

JAY F. SCHAMBERG

Philadelphia

I will not attempt to give you any statistical study of the cases which I have had under my observation, for it would be in large part a duplication of the figures which have been presented to you by the previous speakers. I think there is a remarkable concordance of results throughout the world with respect to malarial treatment of paresis and of tabes dorsalis.

With regard to paresis it would seem that in about one-third of the cases there is a complete remission, and in one-third more a very considerable benefit, and one-third unimproved. And these figures seem to be corroborated by reports from various parts of the world. I will perhaps with your permission, content myself with reference to a few cases of special interest.

The number of cases under the observation of Dr. Greenbaum and myself is considerably less than that of the previous speakers. We treated nearly seventy cases, and this included paresis, tabes dorsalis, cerebrospinal syphilis, and a few cases of congenital syphilis in adults. One case of a parietic, thirty-five years of age, private patient, who had classic serologic and clinical evidence of the disease is of interest. He went through fifteen paroxysms of malaria. Before the treatment was instituted he was violently manical, had to be restrained hand and foot in bed.

At the end of the malaria treatment he was perfectly rational, and after his convalescence left the hospital for his home elsewhere, and for the past two years has been pursuing his usual vocation as a civil engineer giving entire satisfaction. One year after the treatment there was complete negativity of the blood Wassermann which is quite an achievement, because, as Dr. Kirby has remarked, the blood Wassermann and the spinal fluid Wassermann are ordinarily irreducible with the ordinary methods of treatment. His spinal fluid Wassermann was moderately positive, a typical paretic gold curve had changed to a luetic gold curve. A second case is somewhat unique as far as I can make out from the literature. A man of fifty-six with a chronic cerebrospinal lues, fixed pupils and strongly positive blood Wassermann and strongly positive spinal fluid findings sustained upon very slight provocation a fracture of a metatarsal bone of the foot, which did not heal. Later decalcification of the surrounding bones developed which was thoroughly studied by a number of orthopedists. Numerous roentgenograms were taken and it was finally pronounced that he was suffering from an arthropathy. This lasted for some months. He had previously had all sorts of approved luetic treatment.

In view of the fact that he had had so much treatment without influencing his serologic findings, I recommended the use of malarial inoculation. He went through a very nice course of malaria and within a very short time the fracture healed; he was able to walk first with a cane, and later without a cane, whereas, at the time of the first visit he was on crutches; subsequent X-ray pictures of his foot showed a complete recalcification, a complete restoration of structure; the orthopedists now state that it is impossible to differentiate between the bones of the two feet.

This case is of particular interest I think because it suggests the advisability of the use of this method of treatment in early syphilitic arthropathies.

The third case is that of a man thirty-four years of age who had had quite an adequate early treatment for his

syphilis, but his blood Wassermann remained strongly positive. Spinal fluid Wassermann showed a strong positivity with a suggestive paretic curve; in view of this fact we subjected him to malarial inoculation. He went through a course of some twelve or thirteen paroxysms. After that his neurasthenic condition and his loss of sexual power improved, and he took on some twenty pounds in weight. I think my colleagues of this evening, if they were to dwell on this subject would inform you there is often a marvelous improvement in the well-being of paretic patients and others after malarial treatment.

This improved condition was maintained for a year. At the present time he has a strongly positive spinal fluid, a very weakly positive blood Wassermann, and a suggestively paretic gold curve. There are no mental symptoms whatsoever to-day. His neurasthenic symptoms have disappeared. He contemplates marriage and wants our advice upon the subject. Here is a man who, it seems to me, it is advisable to reinoculate with malaria if we can. This brings up the question of the indications for the employment of malarial inoculation. In advanced paresis after a very considerable degree of degeneration has taken place, it is obvious that all one can hope for is improvement, perhaps arrest; in many cases no improvement whatsoever will be achieved.

The most ideal results should be achieved in the early cases of paresis, or preferably, in the pre-paretic state. In those cases in which a patient after an adequate anti-syphilitic treatment shows a persistently positive spinal fluid Wassermann and other pathological alterations in the fluid, malarial inoculation should be tried.

Some two years ago I had the opportunity while in Vienna of being shown by the late Professor Kyrle a series of records of patients whom he had treated with malaria, patients in all stages of syphilis. He was treating early syphilis as well as late syphilis, treating it even in the early primary stage after a preliminary course of six neo-salvarsan injections, and the treatment followed by six

neosalvarsan injections. He told me that he could count the relapses upon the fingers of one hand and his series of cases covered fifteen hundred inoculations.

Now, the significant thing about his records was this (and he showed them to me at random): Patients who had had persistently positive spinal fluid Wassermanns, more or less latent cases, that had received all sorts of approved luetic treatment, without any change in the serologic findings would show negative reactions in the spinal fluid in from six to nine months after malarial treatment in a very high percentage of cases. This was quite striking, and it is the opinion to-day of some of the best German syphilographers, that malarial inoculation should be employed in this very condition in patients who, after energetic courses of antisyphilitic treatment, show persistently positive spinal fluid Wassermanns, before any nerve symptoms develop. That is the ideal stage in which to treat these patients, for in the majority of cases they are still relatively young men, and fairly robust, and the risk of malaria in such cases is less than in the well advanced cases of paresis.

Now, there is a certain risk with malarial treatment, as has been emphasized by the previous speakers. Some men have been more fortunate than others with their cases. The fatality depends a good bit on selection. In our seventy cases we were fortunate enough to have only one death and that was in a paretic. But a great many of our patients were not paretics. And furthermore none of them were asylum cases, although some quite well advanced.

Again, when you come to treat private patients with malaria you will find that it is a most disturbing and distressing method of treatment to apply. The hardened, lowest stratum of asylum cases may perhaps not complain of suffering, but when you get more sensitive patients who have been bred in greater luxury, you will find that the high fever, the severe chills, the drenching sweats, the accentuation of all previously existing pains and the development of new ones will be bitterly complained of, and it

is not a method of therapy to be lightly taken up, apart from any danger that may be attached thereto.

Now, as has been stated, there is no constant parallelism between the serologic and the clinical improvement. In some you will get a negative blood Wassermann, and spinal fluid Wassermann with little clinical improvement and in other cases quite the reverse may take place. What is most significant of all is the marked regression in the pathologic picture as has been commented upon by Dr. Kirby. Nearly all of the histologists who have examined the brains of paretics who have received malarial treatment are in accord that there is a remarkable change in the microscopic picture to such an extent in many cases that it would be impossible to identify the brains as those of a parietic, and indeed it is quite astonishing to histologists that such a degree of pathologic regression or restoration can take place; even more significant is the fact that in the vast majority of cases in which an opportunity has been given to examine the brain carefully for spirochaetes after malarial inoculation they have been found absent. I believe it is generally held that in about 33 per cent. of brains of paretics it is impossible to find spirochaetes. But a competent histologist will find them in the remaining cases.

Bielchowsky, Kirchbaum of Hamberg, two observers from Vienna, Straussler and Koskinas, and more recently, Freeman of Washington, have in the aggregate examined almost one hundred brains most carefully and in not a single instance were they able to find spirochaetes. Forster of Germany, however, in examining several cases did find spirochaetes in one instance.

A very interesting case was related by Jahnel of Munich who did a cerebral puncture upon a case of paresis and found numerous spirochaetes. The patient then developed a purulent pleuritis and ran a high temperature for several weeks, finally succumbing. A most painstaking study of the brain failed to reveal spirochaetes. This observation has almost the force of an experiment.

Now, the very interesting point has arisen and was touched upon by Dr. Stone, as to the therapeutic mechanism of malarial inoculation in paresis. From the time of Hippocrates and Galen down to Boerhave and Sydenham through to the present time, there have been instances of patients suffering from various psychoses that were improved or arrested through some intercurrent febrile disease. It was a review of this literature that started Wagner-Jauregg upon his fever inducing experiments.

It will be realized that there was no particular specificity in the fevers, but various fevers brought about these results. I should state that the dominant opinion held today chiefly by European observers is that the fever induced is not the prime cause of improvement. Many hold the view that in some way malaria brings about certain antibody production which is noxious to the spirochætes. Others hold that the death of the malarial parasites produces some protein substance which stimulates the defensive mechanism of the body.

We have endeavored in our Research Institute to carry out certain experiments with a view to shedding light if possible upon this very complex question. We have been able to prevent syphilis in the rabbit by giving the rabbit a series of daily very hot baths, four days after intratesticular inoculation of a spirochætic emulsion.

I may add that in some 5,000 syphilitic inoculations in rabbits, as I recall, we have had 100 per cent. successes in inducing syphilis. If these animals receive a hot bath, 113° Fahrenheit for about fifteen minutes on eleven successive days no syphilis develops, no clinical evidence of syphilis, no syphiloma of the testicle, and furthermore if the femoral and popliteal glands are removed several months later and inoculated into other rabbits, which is a necessary procedure to prove failure of infection, these inoculations are negative.

We were enabled too to produce a rapid healing of a secondary syphiloma with fifteen baths, almost daily, excluding Sundays, and with an average rise of temperature

in the rabbit of from 4° to 5° Fahrenheit. Chancres heal as quickly as if you had given them a curative dose of arsphenamine. The spirochætes disappear within a few days. It is quite striking to note the rapidity with which these chancres heal up under hot baths.

Now, of course, this simply shows that the elevation of the body temperature of the rabbit has a healing effect upon rabbit syphilis. It does not indicate whether the effect of the heat is direct or indirect. In order to throw some light upon this question we subjected spirochætes suspended in physiologic salt solution in a test tube to heating upon a water bath.

We carried out three separate experiments of this kind now covering a period of a year and a half or more. In the first experiment, the spirochætes heated to 40° or 41° Centigrade, about 104° to 106° Fahrenheit, for an hour and a half failed to induce syphilis in the rabbit, although at the time of inoculation the suspension under the dark field microscope showed numerously active organisms. They were in some way biologically damaged or paralyzed so they were later unable to produce their disease effect.

In a second series of experiments we did not obtain exactly the same result, but a very interesting one. A series of some twelve rabbits was inoculated and twelve kept as controls. That is, they were inoculated with the unheated spirochætes. The latter all developed syphilis within eighteen to thirty-six days, that is, developed a syphiloma of the testicle containing spirochætes.

But those infected with heated spirochætes within thirty-six days were entirely free, but thereafter from the thirty-sixth day to the eighty-eighth day they began gradually to develop a syphiloma with the presence of spirochætes. Two of them developed the lesion upon the eighty-eighth day. In this experiment the period of incubation was greatly lengthened.

In a third experiment which is about terminating we confirmed the first one. In other words, the animals have

not developed syphilis during an observation period of over one hundred days. Certain precautions are necessary in this experiment. One must not have any large particles of testicle in the spirochaetic emulsion because it may not be permeated by the degree of heat employed. One must not pour from the test tube, but pipet the solution out with a pipet because the upper wall of the test tube may contain spirochaetes clinging to it which are not subjected to the degree of heat which is registered by the thermometer. I may say the gland transplantations from these rabbits have likewise remained negative.

It would seem from this experiment and from certain others that have been carried out that the spirochaete is extremely thermolabile. If you heat the spirochaete to $105\frac{3}{4}^{\circ}$ Fahrenheit, for six hours, its motility begins to cease and it breaks up. This is a much lower degree of heat than is necessary to destroy ordinary bacteria.

These rather interesting experiments upon the rabbit suggested to us the trial of very hot baths in the treatment of human syphilis.

It is rather interesting to observe that in almost all countries, patients for some centuries suffering from syphilis have migrated to thermal springs. We have our own hot springs here in the United States. In Japan they have some noted springs at Kusatsu where the natural temperature of the water is extremely high and patients there get into water at a temperature of 121° to 123° ; after becoming accustomed to it they can stand this temperature for a few minutes; it is said that these springs are particularly curative for patients who are losing their noses, which suggests to most of us syphilis.

We have been able to produce a temperature from 102° to 103° to 106° , in human beings by means of hot baths without any material danger. The patient has an ice cap upon his head and special appliances are employed to keep the temperature at a given point. The temperature of the water is about 112° or 113° increased gradually; the

maximum temperature is only maintained for fifteen minutes, although the patient is in the water for about forty-five minutes.

We have treated early syphilis by this method in order to determine what it would do. We have noticed the disappearance of the secondary eruption. We observed the disappearance of superficial tertiary eruptions. We have observed a quantitative reduction in the strength of the Wassermann reaction upon which we would not insist too much.

One would hardly expect the use of hot baths by raising the body temperature in the human being to have the same curative influence on syphilis as malaria. It is not our expectation that such would be the case. But we are endeavoring to determine whether the use of extremely hot water associated with other methods may not abbreviate the period of disappearance of symptoms and bring about negativity of the Wassermann test more rapidly and thus constitute an adjunct or aid in the treatment of syphilis. We observed some side effects which were rather interesting. There is a brief leukocytosis followed by a reduction in the white cells, a slight rise in the systolic blood pressure with a marked fall in the diastolic blood pressure, almost to zero at times. There is, on the average, a 10 per cent. increase in the blood sugar and a 10 per cent. decrease in the cholesterol. The uric acid and urea of the blood are unchanged. There is no change in the proteolytic or lipolytic enzymes in the blood.

Whether this method of treatment will have any place in the therapy of syphilis is a question which can only be determined by further observations and study, and whether any other fever inducing method will serve to act as a substitute for malaria can only be determined by further study. The intravenous injection of typhoid vaccine by bringing about a sharp rise of temperature to a very considerable height has given interesting results, but unfortunately the period of fever is not protracted.

In malaria we have a rise of temperature of very considerable degree for a period often of six hours continuously, whereas with the injection of foreign proteins or drugs designed to raise the body temperature the rise of temperature is very brief. That must be taken into consideration in adopting substitute methods. There can be no doubt, I believe, and it is the general consensus of opinion, that the results achieved from malarial inoculation in paresis have exceeded those which have been obtained by other methods. Paresis was the one stumbling block in the progress of our treatment of syphilis. Various remarkable advances had been made but despite all these advances, despite the introduction of the newer drugs, paresis was still the malign and ultimate outcome in many cases.

But it does seem now as if methods are at hand whereby paresis may be improved, may be perhaps arrested, and who knows, may be cured. If we may judge from the remarkable change in the microscopic picture and if we may judge from the fact that in Vienna some of the parietic patients are well and working after six, seven or eight years, and some of Dr. Kirby's cases are apparently well and working at the end of three or four years, it is only the future which will enlighten us as to the ultimate verdict.

*A Symposium on the Use of Antipneumococcic Refined
Serum in Lobar Pneumonia¹, December 15, 1927*

I

THE CONTROL

(ABSTRACT)

JESSE G. M. BULLOWA

A. THE IMPORTANCE OF A CONTROL SERIES OF CASES²

The evaluation of the effect of any therapeutic procedure in pneumonia is attended by certain inherent difficulties. Probably seven of every ten patients recover regardless of treatment, and therefore if one chances upon a succession of favorable cases, he is apt to attribute the benefit to the special treatment then in use. A short series of fatalities, unless carefully controlled and analyzed, may lead to a condemnation of what is really a very useful procedure.

Refined concentrated serum is desirable in order that the dose may be small and readily administered without severe reactions. It is desirable that it be polyvalent (several sera may be mixed) because the pneumonias resulting from pneumococci of different serological types may be indistinguishable at the onset. Because no one can foretell with certainty the cases which may develop adequate protection in response to the pneumonic invasion, the benefit from treating patients is best discovered by comparing the results in a series of serum treated cases with a similar series treated without serum.

At Harlem Hospital each alternate patient with pneumonia is placed in the serum series. It is not practicable

¹These researches were financed by Mr. Lucius N. Littauer through the Littauer Pneumonia Fund of New York University in association with the Influenza Commission of the Metropolitan Life Insurance Company and the Research Laboratory of the Department of Health, New York, N. Y.

²The clinical studies are from the Medical Service, Harlem Hospital, Dr. Lewis K. Neff, Director.

Dr. Louis I. Dublin and the staff of the Statistical Bureau, Metropolitan Life Insurance Company, tabulated the data.

to alternate the cases according to type on admission as this might occasion a delay of many hours or days. The injection of a powerful polyvalent serum of Types I, II and of a less potent Type III assures prompt treatment of the cases selected for serum.

We accept and retain as pneumonia patients those having pneumococcus infections of the lung with definite lobar involvement, as evidenced by unmistakable physical signs, fluoroscopy, or radiography.

Except for the serum, all patients are given the same medical care in respect to drugs and nursing, in accordance with a definite plan.

B. DATA NECESSARY ABOUT THE CASES BEFORE ONE IS CAPABLE OF JUDGING THE EFFECT OF SERUM

On admission cases are rated in accordance with a definite plan. The rating assumes 100 to be health and for each of five categories a maximum of 20 may be subtracted.

Respiratory: Involvement. Rate. Pleurisy.

Nervous Condition: Headache. Irritability. Sleeplessness. Delirium. Apathy. Coma.

Circulatory Efficiency: Rate. Cyanosis.

Gastrointestinal: Distension. Vomiting.

Complications. Special Factors.

In our series studied during the past year we had 401 cases of lobar pneumonia, of which 28 were rejected because it was impossible to type them, and 8 because of concurrent febrile diseases, such as scarlet fever, tuberculosis, etc.; 365 remain to be studied, 169 in the serum series and 196 in the controls; 220 were rated.

In a general way the rating on admission indicated chances for recovery. The Type I cases treated were sufficiently numerous to classify as good, fair and poor. Chart (5). Of 6 patients rated poor (below 50) we saved 2 patients with serum, while we lost all treated without serum;

of those rated fair (50 to 70), we saved 4 of 6 in the serum group against 6 among 11 without serum. We saved with serum some very ill patients who might have died without it.

Many have maintained that the excellent results reported with serum treatment in hospitals have been due to the early hospitalization rather than to the serum. For both Type I and Type II serum series the mortality among both early and late cases was less than for the controls.

Not only did the serum treatment appear to reduce the number of deaths but it shortened the illness of those who recovered. Certainly this was advantageous, as it meant a saving in hospital care and of subsequent invalidism.

With serum we not only saved more patients and shortened the illness of those who recovered, but apparently the serum delayed death in those who perished, just as occurs in animal experiments.

When we combine all the cases early and late by types, and study the effect of the serum, it will be noted that Type I and Type II for which we had potent sera, showed fewer deaths per hundred among the serum treated cases. The greater benefit from early treatment has been revealed on charts already shown.

C. SIZE OF SERIES REQUISITE

Naturally, as physicians, we considered how long we were justified in continuing to deprive patients in the control series of what may be a valuable and available therapeutic aid. In spite of the fact that we were impressed, as the research proceeded, by the beneficial results of the serum, the question arose as to whether there was conclusive proof that the serum is of value. What test can we apply to our data to see whether proof is adequate and how can we determine the number of cases necessary for a judgment? This leads us into a brief digression into what differences in results is statistically significant, and the meaning of the standard error.

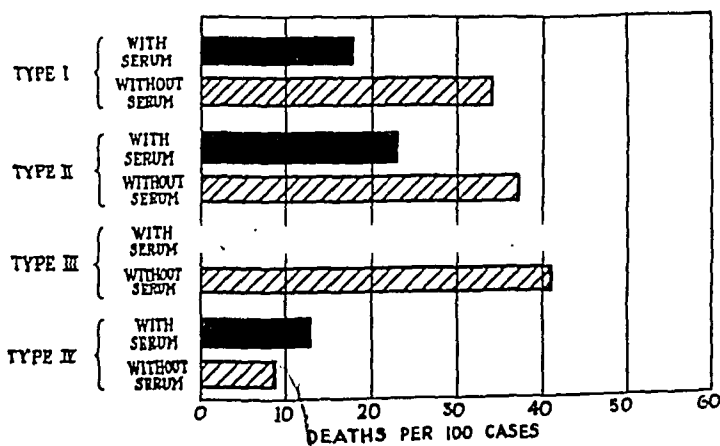
Without going into technical details, it may be explained that the relative spread, or flatness, of the curve of occurrence of a quality is measured by what is called the standard error of the measurements. In order that the difference between measurements in two separate materials, *e.g.*, case fatality of two similar hospital populations with pneumonia, one of which received serum, shall be recognized as definitely significant, the distance between the peaks of the two curves must satisfy a certain statistical test. The difference between the average measurements in the two cases must be at least equal to twice the "standard error" of the difference. Whenever this ratio falls below 2, we are not in a position to judge whether any significant meaning is to be attached to the difference.

Deaths per 100 cases
Pneumonia patients treated (A) with Serum and
(B) without Serum

Harlem Hospital, September, 1926 to October, 1927

DEATHS WITHIN 24 HOURS OF ADMISSION EXCLUDED

Type	(a) WITH SERUM			(b) WITHOUT SERUM			Difference in Case Fatality (a-b)	Ratio of Difference to its Error
	Cases	Deaths	Deaths per 100 Cases	Cases	Deaths	Deaths per 100 Cases		
Type I	55	10	18±5.2	53	18	34±6.5	-16±8.3	1.9
Type II	26	6	23±8.3	38	14	37±7.8	-14±11.4	1.2
Type III	24	11	46±10.2	17	7	41±11.9	5±15.7	.3
Type IV	54	7	13±4.6	82	7	9±3.2	4±5.6	.7



In the Type I cases we have practically obtained a result which is twice the standard error, 1.9. A greater difference in the percentage recovery of treated cases than those untreated may be accomplished by future improvements in the serum, and by earlier administration. Even though the serum were to remain as it is and the difference in the results the same as at present, 16 per cent., a greater number of cases would reduce the standard error and carry conviction of the value of serum treatment. When, for Type I pneumonia, the ratio of the difference in per cent. fatality between serum and non-serum treated cases to its standard error, becomes more than two or three, it will be our duty to administer serum in all Type I cases and urge its administration on others.

To evaluate the result of a treatment in pneumonia, there are required adequate comparable series with and without the treatment. We believe we have obtained such series by the devices adopted—alternating patients and rating them on admission. The size of the series requisite is determined by a consideration of the standard error.

II.

THE RELATION OF BACTERIEMIA IN LOBAR PNEUMONIA TO PROGNOSIS AND SERUM THERAPY

MILTON B. ROSENBLUTH

Blood cultures were made on 500 patients with lobar pneumonia. The statistics were analyzed from the standpoint of prognosis and serum therapy.

As to the incidence of bacteriemia in lobar pneumonia, investigators have reached widely divergent conclusions. Some, such as Prochaska and E. C. Rosenow, have reported positive blood cultures as occurring with great frequency, the former having found them in 100 per cent. of a series of 50 cases, the latter in 91 per cent. of a series of 175. On the other hand there are many who find positive blood cultures in a relatively small percentage of their

cases. Notable among these are Schottmueller, who reports 23 per cent. as positive in a series of 227, and Cole and his co-workers at the Rockefeller Hospital, who report 27 per cent. as positive in a series of 728. The probable explanation of this disagreement as to the incidence of bacteriemia lies in a difference in the type of clinical material studied and in the employment by one group of certain refinements such as the elaboration of laboratory technic and the taking of more frequent and larger quantities of blood, which were not employed by the other group.

Using a simple routine hospital technic in which 3 c.c. of blood were divided among two hormone agar plates and one tube of broth in a dilution of one to ten, we obtained positive blood cultures in 35 per cent. of Type I cases, 31 per cent. of Type II cases, 25 per cent. of Type III cases and 7 per cent. of Type IV cases.

As to the prognostic value of a positive blood culture there is a remarkable lack of unanimity and the reason for this seems to be closely related to the question of incidence. Those investigators who report a high incidence of bacteriemia have invariably attributed little or no prognostic value to it, while those who report a low incidence regard it as a very serious prognostic sign. I believe this is due to the fact that the separation of cases by blood culture findings into positive and negative groups is too arbitrary and ignores the degree of bacterial invasion which is really the more important factor. If sufficient blood were used and the cultures were made at short intervals it is probable that all or most cases would yield positive blood cultures. But the significance of a few bacteria thus demonstrated should certainly be distinguished from a bacteriemia readily shown in 1 or 2 c.c. of blood.

Comparing the mortality in patients with positive blood cultures and with negative blood cultures we found that in Type I, 16 per cent. of the negative blood culture cases died while 81 per cent. of the positive blood culture cases died. In Type II, 21 per cent. of the negatives died while 75 per cent. of the positives died. In Type III, 17 per cent.

of the negatives died while 85 per cent. of the positives died. In Type IV, 8 per cent. of the negatives died while 100 per cent. (only three cases) of the positives died.

Furthermore, the incidence of positive blood cultures in the fatal cases was more than twice as great as the incidence in the recovered cases.

Early in our work we were strongly impressed with the fact that our statistics taken in the usual manner, comparing mortality rates for treated and control cases, by type, did not adequately express the efficacy of the serum as it appeared to us at the bedside. We had often observed in patients who appeared very profoundly stricken, the most impressively favorable results. This observation and the common knowledge that serum will frequently render the blood stream free of bacteria led us to inquire more closely into the relative effectiveness of the serum in the cases with bacteremia and in those without it. We hoped in this way to obtain more exact data as to the indications for treatment, and as to the better selection of those cases in which serum was apt to be most effective.

On comparing the results of our treated cases with those of our untreated, we found that in Type I the mortality of untreated cases, which was 37 per cent., was reduced in the treated cases to 21 per cent., a reduction of 43 per cent. In Type II the mortality of untreated cases, which was 40 per cent., was reduced in the treated cases to 26 per cent., a reduction of 35 per cent. While these figures are impressive, they do not appear to have been sufficiently convincing even in Type I cases, to interest the medical practitioner in the use of this form of therapy.

However, in the cases with positive blood cultures, the effect of serum treatment appears to be much more strikingly shown. In Type I, 81 per cent. of the untreated cases died, whereas 39 per cent. of the treated cases died, a reduction in the mortality of 51 per cent. In Type II, 75 per cent. of the untreated died, while 38 per cent. of the treated died, a reduction in the mortality of 49 per cent., which is almost as great as that effected in Type I.

The number of doses: The first injection should be large, but before we can speak intelligently of dosage we must agree on a unit of antibody. This we have done with other sera where it was possible to adopt standardized units, as in diphtheria and tetanus antitoxins. No intelligent person would now approve of giving the dose of diphtheria antitoxic globulin solution as so many c.c. instead of so many units.

During the past year the Felton polyvalent preparations which we have used have varied as follows:

Type I antibody between 300 and 2000 units per c.c.

Type II antibody between 100 and 1000 units per c.c.

Type III antibody between 10 and 200 units per c.c.

If these refined preparations of antipneumococcus serum had been simply labelled polyvalent pneumococcus antibody we would in some cases have given unwittingly 1/6th of the Type I antibody and 1/10th of the Type II antibody to some that we did to others. If the refined or unrefined polyvalent serum is to be used extensively in the future, as we hope and believe it is, the Hygienic Laboratory should require the units for each type for which it is recommended to be stated on the package just as it is now for diphtheria, tetanus and scarlet fever antitoxins. If the Federal Government does not see its way clear to do this, the physicians themselves should demand it. Nothing will be more effective in causing the biological plants to perfect their methods and to eliminate the horses producing a serum weak in antibodies than such a demand.

A unit is the amount which protects mice from an average of a million minimal fatal doses of very virulent pneumococci.

In toxic cases of pneumonia the antibody matching the type of pneumococcus causing the pneumonia is quickly neutralized, partly or wholly, by the specific soluble substance while the antibodies in polyvalent sera specific for the other two types are but slightly affected and decline slowly as in a normal person. The amount to be given a

soon as we have available a potent No. III antibody in the serum the same quantity of units should be given. As soon as the case is typed, if the temperature remains high or if septicemia or bacteriemia is shown to be present, the injections of a monovalent or polyvalent serum should be continued every eight to twelve hours. If the pneumonia is due to Type IV pneumococcus, it is well to stop with the third injection. The antibody for these types assembled as Type IV is still so feeble that it is not wise to draw upon the moderate amount of antibody solution available. The same rule applies to Type III cases, for although we have a potent serum against our old laboratory Type III cultures, it is ineffective as yet against the freshly isolated cultures and so is probably of little value in treatment.

If the temperature after dropping rises again above 102° the injections should again be given unless abundant antibodies are shown to be present in the blood or the temperature is known to be due to complications such as serum sickness, pulmonary abscess due to the streptococcus, or other conditions for which we would not expect any advantage from the antibody injections. Methods such as the quick macroscopic agglutination test of Arlyle Noble should be used when possible to detect an abundance of antibody in the blood. If this is present it is wasteful and unnecessary to continue the injections. When unrefined serums are used the number of units in each dose may have to be reduced because of fear of the deleterious effects of such large injections of serum. Within a year or two a plentiful supply of refined serum should be available.

*Papers Delivered at the Annual Meeting
January 5, 1928*

ON THE SIGNIFICANCE OF BACTERIAL ALLERGY IN INFECTIOUS DISEASES

HANS ZINSSER

Boston

The General Principles of Bacterial Allergy

Although the early studies of Koch¹ and his associates on superinfection in tuberculosis and the physiological effects of the injection of tuberculin into infected animals constitute a definite observation on bacterial allergy, this type of hypersensitiveness is less clearly understood than are other phases of this general subject. In the reaction of the animal body to coagulable proteins much has been learned about the mechanism, and we are reasonably well informed concerning the relationship of protein anaphylaxis to antibodies. Generalization from the study of protein anaphylaxis to other forms of hypersensitiveness, at first hoped for, has met with many obstacles, chief among which has been the difficulty of repeating the experiments on passive sensitization with antibody-containing sera which has been the backbone of our understanding of true anaphylaxis. Largely because the mechanism of the antigen-antibody reaction has not been clearly demonstrable in such forms of hypersensitiveness as hay fever and asthma, reactions to animal emanations, certain food idiosyncrasies and the drug idiosyncracies, some immunologists have advocated an entire separation of these conditions from the phenomena of anaphylaxis proper. This view, which was at first advocated by Doerr and is still upheld by many immunologists in this country, has neglected basic similarities in favor of discrepancies which in our opinion do not represent so much fundamental differences of principle as they do gaps in our experimental knowledge.* And these gaps are gradually being bridged by accumulating

*These views have been very thoroughly discussed in a paper on "Hypersensitiveness" by the writer published in the *Boston Medical and Surgical Journal*, 1927, cxcvi:387.

experimental and clinical evidence. We have maintained for a considerable number of years that all forms of specific hypersensitiveness are probably based on the same fundamental mechanism—namely, an acquired altered capacity of the cells to react to the particular inciting substance, in which the varying chemical and physical nature of the antigens is responsible for certain differences in the apparent mechanism, especially as regards the appearance of demonstrable circulating antibodies.*

To consider the mechanism of bacterial allergy, which, incidentally, has not been solved in anything like an adequate manner, would lead us into long and difficult discussions quite out of place in a paper intended to elucidate clinical relations. It will be profitable, however, to outline the present state of experimental knowledge as far as it seems to us pertinent.

The logical approach to the problem is a consideration of modern knowledge of the bacterial antigen recently acquired by the correlation of chemical analysis with functional properties. We know now, from the work of Avery and Heidelberger,² as well as that of our associate Mueller, and ourselves,³ that if we immunize an animal with whole bacteria—either living, formalinized or killed in some other manner that avoids dissolution of the cell substance—we obtain antibodies which are type specific and bring about the well-known test-tube reactions of agglutination, precipitation, opsonization, etc. If the bacteria are subjected to even the most gentle chemical cleavage—indeed, even to such mild changes as autolysis or its probable analogue, solution by bile (which is feasible in a limited number of them)—the bacterial antigen may be split into at least two antigenically functional fractions; one, a nitrogenous nucleoprotein-like material, the other,

*Our opinions as to a needed modification of the prevalent conception of antigenic substances have been stated in a paper on the bacterial antigen by the writer and Mueller which is to appear in a series of immunological papers to be published under the editorship of Professor Jordan of Chicago, under the title of "The Newer Immunology."

a partial antigen, probably of carbohydrate structure, which has been called the "soluble specific substance" by Avery and Heidelberger, the "residue substance" by ourselves. We will adopt, hereafter, the terminology of Avery and Heidelberger, because we think the term better chosen as more descriptive. The antibodies which are produced by the injection of the whole bacteria will react specifically by precipitation with the soluble specific substance, but the soluble specific substance injected by itself will not cause antibody formation of any kind and is manifestly, therefore, a sort of haptophore group which is present in the whole bacteria and lends them other specific properties. Immunization with the nitrogenous nucleoprotein material will produce antibodies, but these antibodies are of a different kind from those produced by the whole bacteria and are less restrictedly specific, representing a loose species specificity rather than a type specificity.

We published these views with Tamiya in 1926, in the same number of the *Journal of Experimental Medicine* in which, to our great satisfaction, an entirely corresponding analysis was published by Avery and Heidelberger, whose graphic illustration of the conditions follows:

The study of these phenomena has yielded a certain number of definite facts which we can best illustrate by taking our examples from the tuberculin reaction itself. Such "bacterial allergy," as it is called, does not develop, as Baldwin⁵ pointed out many years ago, without tissue reactions in the form of tubercles. It was for a time believed that tuberculin allergy was an infection rather than an injection reaction, in the sense that an animal did not react unless he were infected with living organisms. It was shown a long time ago, however, by Prudden and Hodenpyl⁶ that dead tubercle bacilli could give rise to tubercles, and some years ago the writer with Petroff⁷ definitely confirmed the fact that animals can be rendered allergic by the injection of dead tubercle bacilli, provided that tubercles resulted from the injections. Indeed, such allergy could be produced with tubercle bacilli that had been boiled, and a relatively small dosage sufficed to bring about the condition.

It is clear, therefore, that Baldwin's dictum "No tuberculin reaction without a tubercle", or—in other words—without inflammatory tissue reaction, is still valid, even though it is immaterial whether the inflammation is in response to living or to dead organisms.

If guinea-pigs are treated systematically and for a long time with the nitrogenous fraction of tubercle bacillus extracts they do, indeed, develop a form of allergy; but this is quantitatively far less marked than when dead tubercle bacilli, or the unfiltered extracts containing bacterial fragments are used.

Such dependence of the fully developed allergic response upon tissue reactions is so clear and invariable that it must be interpreted as a fundamental premise. Yet, in spite of the essential nature of the tissue reactions in the genesis of the allergic response, the specificity of the reactions, in the sense that tuberculin hypersensitiveness follows in its full development only stimulation by the presence of tubercle bacilli, indicates that the stimulus

itself, though requiring tissue reactions to be allergically effective, must originate in the bacteria themselves. We are thus confronted with three facts, which must be co-ordinated: First, that it is the presence of the tubercle bacilli which incites a specific reaction; next, that the antigenic stimulus is not released from bacilli except by the presence of tissue reactions; and, thirdly, that the injection of chemically produced tubercle bacillus cleavage products which, because of their solubility, fail to incite tissue reactions, are not capable of eliciting more than a feeble allergy.

These facts have puzzled immunologists for a long time and have led to much experimentation that has included the injection of extracts of tubercles (Bail,⁸ Lange,⁹ Zinsser and Tamiya, and others) and the treatment of animals with extracts of normal tissues and inflammatory tissues from sources other than tuberculosis. In 1921 our own experiments¹⁰ convinced us that the tuberculin reaction had no relationship to the ordinary agglutinating, etc. antibodies; and that it was distinct from the typical anaphylaxis which, by sufficiently prolonged efforts, can be induced in animals with bacterial proteins. It is this fact which explains the failure of so many to produce passive sensitization to tuberculin with the serum of animals immunized with tubercle bacilli. Many of the theories which have been advanced to explain the tuberculin reaction, and which have depended upon the conception that a toxic substance is split from the tubercle bacilli by immune sera have remained unsatisfactory.

In seeking for light on the subject, we turned, a few years ago, to the study of allergic reactions with other bacteria, in which both chemical cleavage and antibody production were more simply and easily attained. We worked with typhoid bacilli, staphylococci and hemolytic streptococci, all of which yielded a certain amount of information; but we obtained what we believe a reasonable clue to the mechanism by studies with the pneumococcus. This organism—as everyone knows—autolyzes readily in culture

and in suspension, and is easily dissolved in bile—a process which, with Atkin,¹¹ we are inclined to interpret as merely a speeding up of spontaneous solution.

Briefly outlined, our experiments indicated that young guinea-pigs that do not react normally to intracutaneous injections of whole pneumococci, pneumococcus extracts, or pneumococcus autolysates, can be powerfully sensitized if they are treated with whole pneumococcus cultures or with pneumococcus autolysates. While a number of methods of sensitization, all of them depending upon the injection of the whole organism or the products obtained by some method of autolytic solution will sensitize, the final severe and typical skin reaction can be elicited only if autolysates produced either by standing or by treatment with bile, are intracutaneously administered. Guinea-pigs properly sensitized—and the sensitization may be accomplished in as little as six or eight days—may give a feeble reaction to the nucleoproteins produced by alkaline extraction and acid precipitation or by injection with dead whole pneumococci, but will react powerfully if injected with autolysates of the pneumococcus.

These experiments, taken together with the preceding facts, seem to us to indicate a definite line of reasoning which is supported by further knowledge elicited in connection with the fate of tubercle bacilli in the tuberculous animal. Many workers in this country, notably Manwaring and Bronfenbrenner,¹² have occupied themselves with intraperitoneal lysis of the tubercle bacillus, a form of dissolution of the bacilli which so far it has been impossible to produce in the test tube. Though the actual occurrence of extensive bacteriolysis of the tubercle bacillus has been questioned by many workers, the likelihood of the liberation of specific products from bacilli thus injected into the tuberculous animal is encouraged by the important—and in this connection, pertinent—experiments of McJunkin.¹³ These we have on several occasions successfully reproduced, and though it is not easy to obtain them, we consider them accurate observations. McJunkin injected tubercle bacilli into the peritoneal cavities of tuberculous



FIGURE 1.—The reactions on a guinea pig sensitized with the pneumococci. Point A, shows area around injection of pneumococcus autolysate on September 22nd. Point B, showing hemorrhage and necrosis with much edema sagging downward, shows a similar injection of pneumococcus autolysate made on the following day, September 23rd.

(From Zinsser and Grinnell—Further Studies on Bacterial Allergy, *J. of Bacteriology*, xiv, No. 5, 1927.)

guinea-pigs, removed the exudates just before death and filtered them free of bacteria. When he treated normal guinea-pigs with such filtrates, eight or nine days after a series of injections, these guinea-pigs would react with a more or less typical allergy to intracutaneous doses of O. T. McJunkin conservatively leaves it undecided whether he sensitized actively or passively, but putting all the facts together, we think it clear that he sensitized actively with bacteria-free materials and thereby made an important contribution to the understanding of bacterial allergic reactions.

If we consider all of these apparently uncoordinated facts in their proper connection, they seem to us to point in a definite direction, and in order to indicate this clearly, we will recapitulate them before drawing our conclusion.

- (1) Specificity of the tuberculin reaction forces the assumption that, whatever the mechanism, the stimulating substance or antigen must emanate from the bacilli.
- (2) Tuberculin allergy develops in guinea-pigs within two or three weeks after the injection of living or dead bacilli.
- (3) Its development as the result of the injection of dead bacilli excludes the participation of a soluble exotoxin as a necessary part of the mechanism.
- (4) It develops in a typical manner only when tissue reactions (tubercles) are formed around injected bacilli or fragments, and does not develop in its complete form when chemically prepared extracts of tubercle bacilli are administered.
- (5) Nevertheless, the injection of filtrates of peritoneal exudates in which the body cells and fluids of a tuberculous guinea-pig have acted upon the bacilli induce typical allergy (McJunkin).

The coördination of these facts can have only one meaning—tuberculin allergy is a reaction stimulated by a specific product of the tubercle bacillus body, an antigen

which is potently liberated in the inflammatory foci under the influence of tissue reactions, probably by a process of lysis. These conditions can be imitated intraperitoneally, as in the McJunkin experiments, but attempts at chemical extraction of this antigen are never completely successful, probably because—as Gideon Wells has often pointed out—even the most careful chemical manipulation is apt to denaturize the biological properties of cellular substances. It is most likely this factor which has rendered our understanding of bacterial allergy so confusing, and has led to so many initial errors on the part of all who have investigated the problem. Our own experiments with the pneumococcus bear out the above interpretation, since here—with an organism that readily undergoes autolysis in the test-tube—we found that such a biologically produced solution of the bacteria gave rise to reactions comparable in severity to typical tuberculin reactions, whereas none of the chemically produced pneumococcus substances gave anything more than an incomplete reaction in sensitized animals.

Thus, bacterial allergy becomes a simple immunological reaction in which characteristic development and typical reaction depend upon an antigen which cannot be produced in its full functional activity except by the gentle biological process of lysis or autolysis.

The final proof of this conception still awaits *in vitro* autolysis of tubercle bacilli and other organisms—an accomplishment in which, so far, we have failed. But, lacking this final link, it seems to us reasonably clear that in bacterial allergy we are dealing with the sensitization of the body by autolytically liberated antigenic substances which are absorbed from any focus in which bacteria react with inflammatory tissues, and as a result of which the body is rendered subsequently sensitive to contact with these same autolytic products, whether they are liberated and absorbed from a chronically existent focus, or from an identical infection subsequently acquired.

recently shown ²³ that Calmette's B.C.G. contains organisms which are capable of inducing a progressive tuberculosis in guinea-pigs and is therefore not, in the proper sense of the word, "avirulent," this very capacity for allergy production may be based on a more considerable extension of its pathological effects than at first suspected. And since we know of our own experience that tuberculin allergy can be produced with no inconsiderable intensity, and can be reasonably maintained, by the repeated administration of dead tubercle bacilli, we believe that this method should be more fully exploited before the more dangerous methods are too widely employed.

ALLERGY AND SCARLET FEVER

The interest that has of recent years been in evidence regarding bacterial allergy in general has included the study of streptococcus infections, and in 1925 Dochez and Sherman ²⁴ and the writer with Grinnell ²⁵ published studies in which sensitization with streptococcus cultures and with filtrates of the so-called "Dick toxin" was carried out. The two studies were essentially alike. In our own work, sensitization was most successful when the whole bacteria were injected, but other streptococcus products—including the Dick filtrate—likewise induced sensitization. It was of considerable interest that the most potent reactions on reinjection were obtained with the Dick filtrates, which are analogous to tuberculin, in that they represent a filtrate of cultures in which a certain amount of autolysis may be regarded as having taken place and which is both heat stable and allergically active. This assumption, moreover, is rendered more likely by the recent work of Duval and Hubbard ²⁶ who find that the culture lysate produced from scarlatinal streptococci *in vivo* is a more potent antigen than the ordinary culture filtrate.

The chief differences between our earlier studies and those of Dochez and Sherman ²⁴ consisted in the fact that they were able to neutralize the allergic antigen by the use of antiscarlatinal serum. We did not succeed in this,

as we had failed previously in many attempts so to neutralize tuberculin with antitubercle bacillus sera made by many different methods. However, we did only a few experiments in this direction, and used only guinea-pigs, whereas Dochez and Sherman worked both with guinea-pigs and rabbits, with this point particularly in view. Studies which we are carrying out at the present time are aimed at further elucidation of this point, and in rabbits it is relatively easy to produce streptococcus allergy by all the methods of sensitization mentioned above, and to obtain reactions which are not unlike the ordinary Arthus phenomenon in its milder manifestations. A recent article which deals particularly with allergic reactions carried out with streptococci of erysipelas and scarlet fever by Dochez and Stevens²⁷ confirms the earlier studies regarding both the production of the allergic state and neutralization with serum, and in its further developments to some extent explains the discrepancy between our own earlier failures to neutralize and the success obtained by Dochez and his collaborators. Dr. Grinnell and I found that guinea-pigs, after having passed through a susceptible phase, passed into an insusceptible one, which we interpreted as the possible sequence of an immune condition upon a hypersusceptible one, a suggestion which encouraged our attempts to neutralize. The last study by Dochez and Stevens deals chiefly with rabbits, in which the conditions of allergy are in some respects fundamentally different from those prevailing in guinea-pigs. Their observations, however, are explanatory of many irregularities which they and we have observed. They find that their animals pass through several consecutive periods: One of sensitiveness, which follows the first incubation time and during which the animals display a cutaneous sensitiveness which can be neutralized with serum; following this a second period of hypersusceptibility supervenes, during which no neutralization is possible; finally the animals again become insusceptible.

Dochez and Stevens interpret their results as lending considerable likelihood to the suggestion recently made

by Bristol²⁸ that the rash and the clinical symptoms of scarlet fever may be due to allergic sensitization to the products of the hemolytic streptococcus. They call attention to the fact that in early infancy intracutaneous injections of the scarlatinal filtrates are usually negative, and Cooke²⁹ adds to this the important observation that the blood serum of such negatively reacting infants has no neutralizing power. This is entirely analogous to observations made by Grinnell and myself on the insensitiveness of young guinea-pigs to pneumococcus autolysate, in that the serum of such animals has absolutely no neutralizing power for the antigen when applied to naturally or experimentally hypersusceptible animals. It is therefore at least important to consider the possibility that sensitization to an organism which so frequently invades the human throat may take place and may thereby give rise to an allergic condition to which many of the manifestations of scarlet fever could be attributed.

Moreover, this, too, would explain why hemolytic streptococci, which are found in so many human infections and all of which, in the recent studies of Mackie³⁰ and of Smith³¹ seem to be capable of producing toxic substances entirely analogous to those produced by the scarlatinal variety, fail in so many cases to give rise to generalized skin eruptions and systemic injuries associated with the classical, clinical picture of scarlet fever.

Such a conception adds to rather than detracts from the importance of the observation made by the Dicks. For it would seem that, in the Dick toxin, we are confronted with an entirely new type of bacterial substance, one which injures the sensitized body, giving rise to symptoms not unlike those to be expected from a primary toxic action; and which, though heat stable and essentially an allergic antigen, is still neutralizable by an antiserum—a mechanism which adds a new and important chapter to the sum of our immunological knowledge.

BACTERIAL ALLERGY AND ASTHMA

The relationship between hypersensitiveness and asthma has long been a well-recognized fact, the respiratory symptoms depending upon the manner in which the antigen gets into the sensitive body and establishes its first and most concentrated contact with the tissues of the respiratory system. It is not even necessary to assume relative concentration of the hypersensitive state in these tissues, though this may well be the case when the sensitization itself is acquired by inhalation of the antigen. That all these conditions can be experimentally reproduced has recently been shown by Ratner, Jackson and Gruehl.³²

On the basis of analogy, therefore, there is no reason whatever to doubt that bacterial allergy may produce similar conditions, provided the proper bacteria gain entrance to or multiply in the upper respiratory tract. Moreover, there are many clinical records of individuals whose asthmatic conditions are in some way related to chronic infection of the accessory sinuses; and there are a few cases on record in which removal of such foci has cleared up the asthmatic symptoms. The indirect demonstration of the etiological connection by skin reactions and desensitization with bacterial materials has been studied particularly by Walker,³³ Frank and Strauss,³⁴ Koessler and Moody³⁵ and by Duke,³⁶ and such investigations have in general supported the idea. It must not be forgotten, however, that such indirect proof is less convincing in the case of bacteria than in that of other antigens, because human beings may be incidentally sensitive to many different bacteria without necessary relationship to an existing asthma. Furthermore, Duke, who thinks these cases are more rare than generally claimed, points out that it is often difficult to distinguish between an allergic reaction and one of actual infection. He also very logically suggests that these cases may be so rare because an individual so sensitized would often be automatically desensitized because of the frequent and prolonged presence of the responsible organisms.

Occasionally direct observations are possible in the case of accidental inhalation of bacterial substances by laboratory workers, and there are probably few laboratories, in which tuberculin is produced or handled in quantity, where severe bronchial inflammation and cough, if not true asthma, has not followed exposure. In our own laboratory a few years ago, when we were concentrating large quantities of tuberculin and unsuccessfully attempting to produce asthmatic seizures by spraying tuberculin into boxes containing tuberculous and normal guinea-pigs, two of us repeatedly experienced severe reactions. In one of us, in a series of three such reactions there were violent systemic symptoms, including rise of temperature and chill, and local respiratory attacks which initiated the seizure, and in one case there was severe coughing and respiratory difficulty, which went on with diminishing severity throughout the attack. The first sign of the condition in this case was irritation and secretion from the nose and trachea, followed by coughing that was sufficiently violent to cause considerable sternal pain. In the other case, the respiratory symptoms were less prominent, but it is interesting to note that though entirely absent during the first attack, they developed during a second attack about three weeks later.

While the proof for the etiological importance of bacterial allergy in asthmatic attacks is not as soundly based as is a similar indication between asthma and other forms of allergy, it would nevertheless constitute a rather astonishing departure from the general analogy if such a condition did not occur.

BACTERIAL ALLERGY AND CORYZA

The condition which is spoken of as the common cold is probably not a clinical entity, and it is not only possible, but likely that a number of etiological factors may produce conditions of this kind. In spite of the fact that most bacteriologists of experience have tried their hands at the elucidation of this condition, it is not even certain at

the present time whether the condition is or is not contagious, and in certain forms of the malady we are personally convinced that the disease can be acquired without contagion. The most noticeable things that strike one in the study of the common cold are, first of all, the large variety of bacteria that have been described at one time or another as responsible, the close similarity of the early stages of every severe cold with the manifestations of allergic conditions such as sensitiveness to pollen, horse dander, animal emanations, etc., and the fact that during the very early stages of the cold the secretions are almost free from bacteria. During the later stages a true bacterial inflammation seems to supersede and then, of course, bacteria are plentiful and their species distribution is dependent to some extent upon the peculiarities of the pre-existing flora in the individual. The filterable virus explanation advanced some years ago by Foster,³⁷ Kruse³⁸ and others has not been substantiated, and our own attempts to link up the cold with the salivary viruses of Levaditi³⁹ have been entirely unsuccessful.

Based on the common experience familiar to everyone we have, on three separate occasions, done an experiment which many have done involuntarily at one time or another—namely, brought on a severe cold under conditions which definitely exclude any relationship to extraneous infection. The experiment is simple, and consists merely in taking a hot bath and then exposing oneself to cold air until an uncomfortable chilly feeling is experienced. Such a procedure usually results within twelve hours in the early signs of a severe cold, which runs its ordinary course.

This perfectly definite train of events excludes infection from without and can be explained only by one of two alternatives—either a direct invasion by bacteria previously present on a mucous membrane in which the capillary disturbances due to the chilling have permitted penetration, or by an allergic reaction of a sensitive mucous membrane to the bacterial antigens present in the

nose when the communication between tissues and surface are established by the capillary permeability resulting from the chilling. It is more than likely that human beings are all sensitive to one or more of the organisms present in their respiratory tracts, and that the degree of this sensitiveness fluctuates according to the recently existing local flora. The noticeable similarity of the early stages of such reactions to the allergic conditions mentioned above, the speed of onset and the almost bacteria-free condition of the early exudate in many cases favor in our opinion an allergic mechanism.

After the allergic reaction has been thoroughly aroused it is only natural that a secondary bacterial inflammatory process should supervene.

It is unfortunately impossible at the present time to conceive a crucial experiment which would prove this point of view. If there were, we would not venture to suggest this mechanism without it. On the other hand, this conception is included in our general thoughts on bacterial allergy because we believe that it should lead to a close epidemiological study of colds, such as that now going on at the Presbyterian Hospital, whereby perhaps the question of contagiousness can be settled one way or the other. Such epidemiological studies in the past have been deceptive, because during the season of colds members of a community or family group are all more or less exposed to analogous conditions, and it is not easy to disentangle the variables influencing distribution of the disease.

ALLERGY AND RHEUMATISM

Clinical evidence has established the association of the conditions of tonsillitis, injuries of the myocardium and of the heart and chorea with the various pathological conditions known as acute and subacute arthritis. The clinical course of what is generally spoken of as an acute rheumatic condition is such that it suggests an infectious etiology, and in the associated conditions of tonsillitis and a limited number of the cardiac lesions bacteria of the

streptococcus group have frequently been found. Yet, though almost all bacteriologists who have had the opportunity to study acute cases have taken frequent cultures from joint exudates and, at autopsy, from pericardial fluid, positive cultural results from these lesions have been the exceptions. We believe, from our own experience on routine cases in a number of different hospitals, from the study of the literature and from reports of persistent and painstaking efforts such as those of Swift and Kinsella⁴⁰ that typical articular and pericardial exudates in acute rheumatism are usually sterile, at least so far as such well-known bacteria as the streptococcus group are concerned. If living organisms are present in such joints with regularity, they must belong to some species not cultivable by ordinary methods. The opinion that no actual infection of the joints themselves exists is, moreover, borne out by the clinical course as well as by the pathological sequences, which are quite different from those of joints locally infected with pyogenic organisms.

We believe it fair to formulate from this that, while acute articular rheumatism and associated conditions in their ultimate etiology are very probably bacterial infections, the actual condition of the joints themselves is not the result of local invasion by these bacteria.

As to the underlying bacterial causation, outside of Achalmé's bacillus and a few isolated observations in which staphylococci have been found, the majority of investigators—guided particularly by the result of bacteriological studies of throat lesions, foci in the teeth, blood cultures and cultures from valvular vegetations—have continued to attribute rheumatism to some form of non-hemolyzing streptococcus. It is needless to review the long literature of this subject, which has been adequately summarized by Swift⁴¹ in a number of places. There has been no great variation in the manner of investigation, none of the workers finding the organism with any frequency in the joint fluids, many of them finding streptococci of one type or another in blood cultures with a frequency ranging

from the probably normal 8 per cent. of Swift and Kinsella to the over 80 per cent. surely exceptional, experience of Herry.⁴² In most cases in which many isolations have been made, such as—for instance—the recent investigations of Small,⁴³ and of Birkhaug,⁴⁴ all but a few of the organisms that were regarded as significant were isolated from the throats and other locations remote from lesions in the joints or the circulation. In this class also belongs a short-chained streptococcus recently isolated by us at autopsy of a case of acute rheumatic infection in which the blood contained a pneumococcus—probably referable to small patches of a terminal infection in the lungs—while the streptococcus was isolated by planting fragments of myocardium—a result which may indicate that so many blood cultures are sterile in these cases because the organisms responsible for the rheumatic condition may be focally located and but rarely discharged into the circulation.

It is not our purpose to go into the interesting subject of a bacteriological analysis of the various types of streptococcus that have been described, except to say that with few exceptions reliable workers have isolated non-hemolytic streptococci belonging either definitely to what is generally spoken of as the *Streptococcus viridans* group or, as in the more recent work, organisms which produced no changes on blood and which may be perhaps most simply described as falling into the Gamma group of Smith and Brown.⁴⁵

In most cases, workers who have isolated such organisms and have further investigated their relationship with rheumatism, have continued their studies by injecting cultures of the particular bacteria into animals, using chiefly rabbits. In many cases they have produced joint lesions in such animals, obtaining pathological changes not unlike those obtained in human arthritis. And, indeed, this is not surprising to anyone who has worked in bacteriology for any length of time, because the development of joint lesions in rabbits injected with any of the usual cocci,

for whatever purpose they may have been injected, is a common occurrence.

Among the most experienced and persistent workers along these lines have been Rosenow⁴⁶ and Swift and his co-workers.⁴⁷ Rosenow in 1913 began the publication of a series of papers in which he reported upon cases of rheumatism from which he isolated streptococci of the viridans type with many of which he was able to produce joint lesions in rabbits. These lesions in many—though not in all—cases were non-suppurative. Since Rosenow developed a theory of specific localization with which we cannot deal in this paper, it would not be useful to review in detail all of his work..

Swift and Kinsella in 1917 found non-hemolytic streptococci of the viridans group in less than 10 per cent. of the blood cultures taken from rheumatic cases. They found that their organisms did not fall into a uniform group, and concluded that it was not justifiable to speak of a specific *Streptococcus rheumaticus*. While they did not completely deny the streptococcus etiology of the disease, they expressed themselves in a manner that left the entire question open. In subsequent papers Swift and Boots,⁴⁷ though chiefly concerned with the influence of salicylates on the joint lesions in rabbits, investigated a larger experimental material which confirmed in point of fact much of the information collected by other workers. Using four strains of non-hemolytic streptococci isolated from blood cultures in rheumatic cases, they produced a large number of joint lesions by various methods of injection. For future reference we wish to call attention to the fact that cultures from the affected joints in the rabbits were positive in not more than 12 per cent. This point will be of considerable interest in our further discussion. Swift and Boots speak of the joint lesions in their rabbits as having "a superficial resemblance to some of the lesions found in patients with rheumatic fever."

These observations of Swift and Boots correspond with considerable accuracy to the earlier work of Rothschild

and Thalheimer,⁴⁸ who produced multiple arthritis in about 50 per cent. of rabbits which they injected with—it is important to note—a variety of streptococci, including viridans, so-called rheumaticus and hemolytic strains, as well as a culture from the Chicago milk epidemic which had been similarly utilized by Davis.⁴⁹ And it is again noteworthy that in less than one third of the affected joints were organisms recovered from the exudates.

The most recent studies that have attracted attention in connection with rheumatism are those of Small⁴³ and of Birkhaug.⁴⁴ Small worked with a strain of non-hemolytic streptococcus of the Gamma type isolated from the heart's blood of a patient who suffered from a typical attack of acute arthritis three weeks after the onset of a tonsillitis. The other thirty strains reported upon by Small were all obtained from throats, with the exception of two from the blood, three from the feces and one from extirpated tonsils. Again we wish to call attention to the fact that while Small obtained joint lesions in a number of rabbits, the cultures taken from these lesions by aspiration from the joints, whenever done, were negative. Birkhaug, whose streptococcus was isolated from the blood during life and from the mitral valve at autopsy, has developed the idea that the rheumatic joint lesions may be regarded as direct effects of a toxic substance produced by his strain, similar in general principles to the toxins obtained by the Dicks with the scarlatinal streptococci.

Of some interest in regard to the probability that no single organism is involved are two cases of acute rheumatic fever from which we obtained cultures recently and which will be reported later. In one of these a green-producing streptococcus was obtained from the myocardium at autopsy, and from the other a blood culture taken at the height of the fever showed two types of streptococci—one a typical Gamma strain like that described by Small, another one a typical viridans.

Whatever one may believe regarding the particular type of infectious organism responsible for acute rheumatic conditions, it seems reasonably clear that both in man and in animals in which acute joint inflammations have been studied the affected joints in the large majority of investigated cases are sterile to the ordinary cultural procedures. And again, neither the subsequent clinical course nor the pathological changes are indicative of localized acute pyogenic infection. If this premise is accepted, the problem concerning rheumatic arthritis is narrowed down to two lines of reasoning. Either the joint conditions are the results of the direct invasion of the joints by an organism still unknown, which has hitherto defied all cultural methods—perhaps a filterable virus, as Swift suggests in one of his papers; or the joint lesions represent remote effects of toxic influences referable to the presence of infecting organisms in other parts of the body. The first suggestion is nothing more than a vague guess resting upon no available evidence. Moreover, it eliminates all reference to the not inconsiderable evidence of the association of streptococci with the rheumatic symptom-complex in man and in animal experiments. The second possibility leaves us two alternatives to explain joint involvement—either a toxic effect due to direct entrance into the joints of a bacterial poison, or the allergic reaction following contact of a bacterial antigen with the joint tissues of a body specifically sensitive to this microorganism. In both of these mechanisms it would be necessary to assume an establishment of free communication between the circulating blood and the joint cavity by conditions of temporary capillary permeability, and this in rheumatism may often be furnished by chilling, exposure to wet and other accidents with which clinical experience has long associated the onset of a rheumatic attack. Either one of these alternatives would be in harmony with the increasing evidence of streptococcus association with rheumatism, and would be consistent both with the usual sterility of joint fluids and with the frequent absence of microorganisms

from the blood stream. Neither of them, in our opinion, would exclude direct bacterial causation of other manifestations of the disease, such as valvular vegetations, Aschoff bodies, etc.—these explanations being limited for the time being entirely to the conditions of the joints.

Causation by a specific toxin would, it appears to us, necessitate assumption of a single specific organism, which is inconsistent with the variety of streptococci that have been isolated and which is unnecessary if we regard allergy as the underlying mechanism. And, moreover, we believe that most of the observations recorded by Birkhaug could be explained by an allergic as well as by a toxin mechanism—perhaps more logically in view of the extraordinary heat stability of his “toxins.”

The first experimental worker who clearly introduced the conception of sensitization into the problem of rheumatism was probably Herry.⁴² Herry introduced extracts of his organisms into joints and sensitized the joints to subsequent lodgment of the bacteria intravenously injected. Faber,⁵⁰ following more or less along the lines of Herry and his predecessors, injected the joints with dead bacteria, using chiefly the *Streptococcus viridans*, and at various periods after the inflammation had completely subsided reinjected intravenously with the same cultures. He often obtained lesions in the sensitized joints of rabbits so treated, but it is apparent from the frequency with which he obtained positive cultures from the joint fluid, that he produced actual infections. Faber's work, therefore, while of considerable importance indicated only that a preceding inflammation created a locus of less resistance in which intravenously injected organisms could later find lodgment. It is true, indeed, that he claimed specificity in the sensitization, a point in which, however, his work is not convincing. Some years later, in 1923, Swift and Boots⁴⁷ took up the same question, carefully controlling fluctuations of virulence of the organisms used, and varying dosage and time relations, and came to the conclusion that specific joint sensitization did not render the joints so

treated more liable to inflammation than were other untreated joints of the same animals.

Our own interest in the allergic explanation of certain forms of rheumatic arthritis was stimulated by the publication of Faber.⁵⁰ Since Faber, however, was working on the idea of producing focal infections, our conception was rather more definitely encouraged by our interest in serum sickness. There is perhaps no more striking and definite example of the relationship of joint manifestations without actual joint infection than the frequent arthritic symptoms which follow in the case of therapeutic horse serum injections into man. And of similar suggestive significance is the fact that such joint manifestations are frequently influenced by salicylates and may move about from joint to joint in more or less the same manner in which acute articular rheumatism is apt to do this. With a pupil, Dr. Wu, we attempted some years ago to induce joint lesions in rabbits by injecting with horse serum until they possessed a high precipitin titer, then injecting the antigen directly into the joints themselves. Curiously enough, we never produced joint swelling in any of these rabbits on first administration, however highly the animals may have been immunized, but on second, third or fourth injection into the same joint definite signs of local sensitization were apparent. These experiments were abandoned at the time, with the hope that other methods of attack might prove more successful. We believe now that they were significant in showing that local sensitization is possible but that it requires, in addition to the immunological mechanism, some factor which establishes a free communication between circulating antigen or antibody and the joint cavity.

Subsequent studies were based largely upon our interest in bacterial allergy, and when a few years ago Grinnell and the writer succeeded in producing severe allergic reactions in guinea-pigs with streptococcus and pneumococcus substances, the matter was taken up again. So far, our chief studies that have reached anything like comple-

tion were carried out with guinea-pigs sensitized to pneumococcus autolysate. In a considerable number of these, when satisfactory skin sensitization had been obtained, injections into the knee joints were practiced—on one side with autolysate, on the other with salt solution—similar injections being made on normal animals at the same time. The results of these experiments may be summarized briefly by the table on the following page.

These nine guinea-pigs showing severely swollen joints were selected from a series of twenty-four. Six of the others showed moderate skin reactions and moderately swollen joints, and nine showed negative skin reactions and negative joints. In no case was the skin reaction positive with a negative joint, and in only one was the skin reaction severe and the joint only moderately swollen.

It is necessary to add again that our experiments, while showing marked parallelism between general hypersensitiveness and the reactions in the joints, were entirely unsuccessful in a number of experiments in which we endeavored to simulate the human conditions by reinjecting the sensitized animals intravenously or intraperitoneally, at the same time injuring the joints either by freezing with ethyl chloride, by puncturing with a sterile needle, or by injecting with salt solution. On the other hand, we not infrequently obtained joint lesions on first injection into the joint, never obtaining such lesions on similar injection into normal animals. Similar observations have recently been made in our experiments upon the sensitization of rabbits to streptococci in which the material used for skin and joint injection was a filtrate made by the technique of the Dicks. These experiments are being continued not only with hemolytic streptococci but with a streptococcus recently isolated from the myocardium of a child which died in the course of acute rheumatic fever. The pathological studies begun on such joints are not yet sufficiently advanced to be recorded. Our present work

GUINEA-PIGS INJECTED INTO KNEE JOINT WITH
STERILE AUTOLYZED PNEUMOCOCCI

Increase of Reaction	Guinea- Pig	First Injection		Second Injection		Third Injection		Fourth Injection	
		Skin	Joint	Skin	Joint	Skin	Joint	Skin	Joint
	1.	Negative	Negative	Moderate	Severe				
	2.	Moderate	Slight	Slight	Severe	Slight	Severe		
	3.	Mild	Mild	Moderate	Severe				
	4.	Mild	Mild	Slight	Slight	Diffuse Edema	Severe		
	5.	Mild	Mild	Slight	Moderate	Slight	Severe		
Severe on	6.	Strong	Severe					Moderate	Very Severe
First Joint	7.	Mild	Severe	Moderate	Severe				
Injection	8.	Moderate	Severe	Moderate	Severe				
Decrease	9.	Moderate	Severe	Slight	Slight				

is being carried out along these lines with streptococci and streptococcus substances in the hope that the still missing links in the chain of reasoning may be forged.

We are quite aware of the fact that, up to the present time, we have added relatively little to the general evidence in favor of the allergic causation of rheumatic arthritis. But it is a difficult problem and, in our own case, has necessitated prolonged preliminary studies on bacterial allergy. It seemed to us, however, that in dealing with the influence of the allergic phenomena on infectious disease in general no phase deserved so complete discussion as this one, and that in no disease has so much indirect evidence been adduced for such a point of view by workers who had other objectives in mind. Summarizing it, we believe the allergic views of this malady logical for the following reasons:

(1) A definitely anaphylactic condition—serum sickness—is accompanied by joint symptoms showing many analogies to articular rheumatism.

(2) In acute articular rheumatism the joint fluids are usually sterile.

(3) In animals following bacterial injection that develop joint lesions the same is true.

(4) Experimentally it appears that the sensitiveness of joints can be demonstrated as to some extent parallel to general sensitiveness.

It would seem to us, also, that the allergic explanation is consistent with the variety of organisms that have been isolated and with the frequency with which exposure, etc., are associated with onsets of rheumatism in establishing abnormal circulatory conditions that lead to a freer communication between the circulation and the joints.

We are not by any means willing to assume that all cases of acute joint inflammation necessarily represent one and the same disease. We believe, however, that for the reasons stated above the allergic explanation is a logical one for at least a considerable proportion of such

cases and more consistent with clinical and experimental facts than any other available explanation at the present time.

SUMMARY AND CONCLUSIONS

Bacterial allergy is a condition in which the body is sensitized to a bacterial antigen. We believe that this antigen, in its most potent form, results from biological disintegration of the bacteria, either by autolysis or a similar disintegration which takes place in inflammatory foci; and it is likely that many of the experimental difficulties that have been encountered are due to the diminution of functional properties coincident to chemical manipulation *in vitro*.

The allergic state represents an increased capacity on the part of the tissues to react to this antigen, which may either come to the body in the form of a new infection, or through the lighting up of an old focus. This increased capacity to react may be injurious and result in pathological changes and disease. On the other hand, in its deeper pathological significance it probably means merely that the tissues through specific sensitization are on a hair-trigger and can respond both cellularly and humorally to this antigen with a speed and vigor not possessed by the normal body. In this sense, the allergic state may in certain instances be regarded as an index of resistance—a thing which we believe to be true in the case of tuberculosis; and since the allergic state can be brought about by dead tubercle bacilli, we believe that attempts at active immunization in tuberculosis are at least as logical as immunization with attenuated living cultures, and manifestly safer.

It is probable that in order to produce any sort of noticeably acute pathological change in the tissues of a sensitive animal it is necessary that the antigen shall reach the tissues in a relatively concentrated state. This seems indicated by our own experience in obtaining violent hemorrhagic skin reactions with pneumococcus autolysate in

guinea-pigs which reacted hardly at all when the same and larger amounts of antigen were distributed over the entire peritoneum by intraperitoneal injection. It may also be that the situation is complicated by local differences in degrees of sensitiveness of individual tissues—a view which experiments in rheumatism encourage.

Finally, it seems to us that the work of the Dicks, of Dochez and, to some extent the experience of Grinnell and the writer, indicate that a new form of bacterial substance was discovered when the Dick toxin was brought forward. It seems that in this material we possess a heat stable bacterial product which is both a sensitizing antigen and can be neutralized by a serum. In the case of tuberculin no neutralization by immune serum has been possible, but with the streptococcus products both the Dicks and Dochez in their scarlet fever work, and Dochez in purposeful animal experiments on the study of allergy have shown that serum can be produced which will neutralize the allergic antigen; and his experiments with Stevens, as well as our own with Grinnell, have shown that animals can in the course of treatment pass through an allergic state into one of immunity to the same agent. And with this recognition a new type of immunological manifestation is being uncovered.

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*LOBAR PNEUMONIA CONSIDERED AS A PNEUMOCOCCIC MASSIVE ATELECTASIS OF THE LUNG

(ABSTRACT)

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During our experimental work¹ on massive atelectasis of the lung, we observed such striking similarities between massive atelectasis and lobar pneumonia that we were stimulated to investigate this problem further and to present our findings. Our work is far from being terminated; but the importance of positive results obtained so far seems so great that we are presenting this preliminary report with the hope and belief that it may be of some help to other investigators on lobar pneumonia.

We came to the conclusion that lobar pneumonia must be considered as a "pneumococcic massive atelectasis of the lung" and bronchopneumonia as an infectious patchy or lobular atelectasis; that a pneumococcic infection of the bronchial tree is not sufficient to produce lobar pneumonia. Another factor is necessary for determining this lobar pneumococcic cellulitis of the lung and this is: The occlusion of a bronchus exactly as in massive atelectasis, the obstruction being due to the particularly tenacious fibrinous bronchial pneumococcic exudate and to the inflammatory edema of the bronchi. If our interpretation of the experimental facts be accurate and the theory based upon them right, a number of features in pneumonia inexplicable to this date can receive a simple and easy explanation; these are: Its lobar distribution, the sudden onset, the crisis, the abortive forms, the predominance of localization in the inferior lobes, the often found displacement of the heart and diaphragm to the affected side, etc.

Furthermore from the similarities between lobar pneumonia and massive atelectasis, both being to our mind

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secondary to bronchial occlusion, may arise the possibility of an additional mode of treatment, perhaps more surgical than medical, at least in the earliest period of pneumonia. In this preliminary report we shall give the results of our experimental work, with the hope that shortly we shall be able to report clinical results; and a brief resumé of the bronchoscopic examination, and bronchial aspiration of a human pneumonia case. This latter corroborated our experimental findings.

Massive atelectasis of the lung is characterized clinically by its dramatic onset with pain, dyspnea, often cyanosis, elevation of temperature and acceleration of pulse, dullness of one or several lobes with displacement of the mediastinum and its contents, trachea and heart, to the affected side and elevation of the diaphragm of the same side. Rarely cataclysmic and fatal, massive atelectasis usually ends after a few days by crisis, or lysis. In our investigation of the etiology and mechanism of post-operative atelectasis we came to the conclusion that the exciting cause is only one—the occlusion of a bronchus by mucous secretion; the other causes advanced, such as pain, narcotics, posture, limitation of respiration and cough, inhibition reflexes and disturbances of the ciliary epithelium being only predisposing factors.

In a previous work ² we perfected a new technique consisting in the use of a small elastic balloon in which was incorporated a one-way valve by means of which the balloon could be filled with concentrated solution of sodium bromid, opaque to the X-ray, and thus made visible on the plate. By this procedure we have been able to block a given bronchus. After blocking the bronchus the clinical and X-ray evolution was typical of massive atelectasis.

All of our X-rays are strictly symmetric pictures taken with a special apparatus for avoiding distortion so far as possible. To avoid the irritating effect of narcotics on the respiratory tract the anesthetic used was isoamyl ethyl barbituric acid (amytal) injected into the peritoneum.

We give here only two of our 53 experimental cases on massive atelectasis to which our pneumonia cases will have to be compared later.

FIGURE 1



In dog 251 (fig. 1), the left bronchus was blocked. After twenty-four hours a complete left collapse was produced (fig. 2). Notice

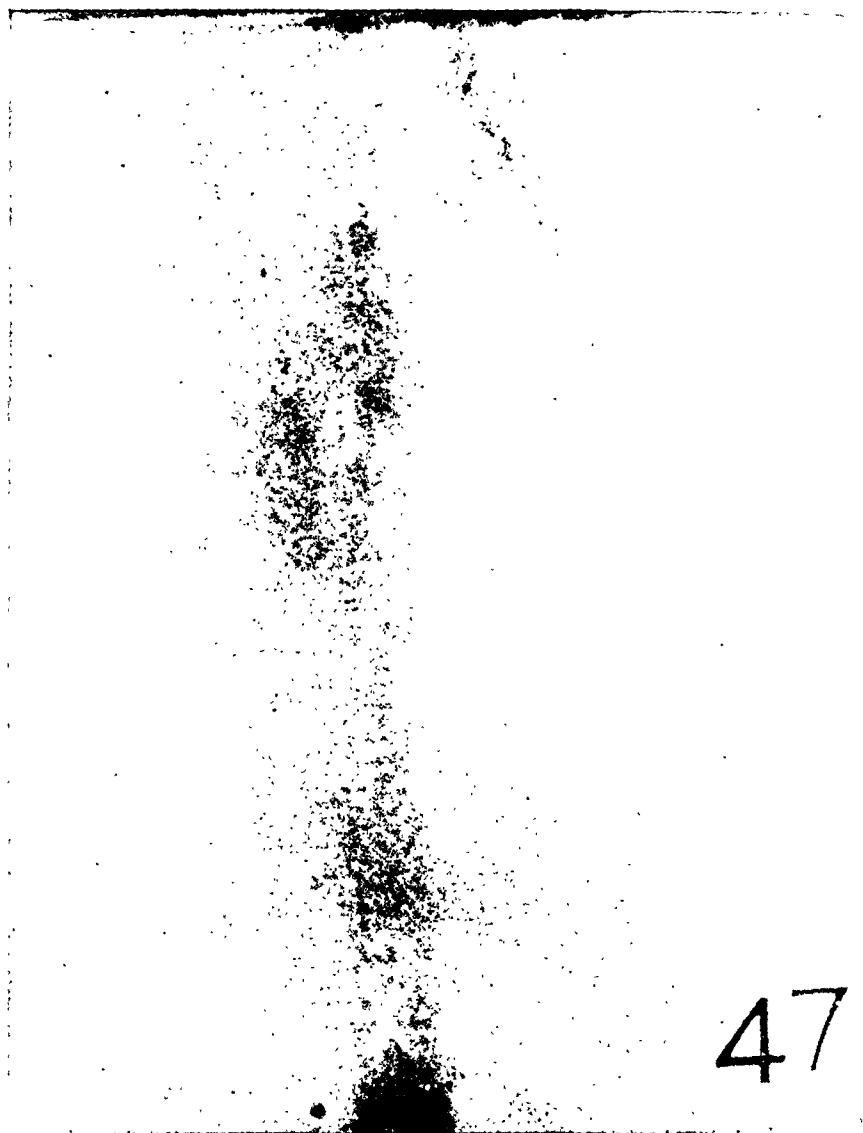
FIGURE 2.



the clear triangular area marked by letter "T," which is due to encroachment of the good lung upon the affected side and presents a curious similarity to the sonorous triangle described by Lord² in pneumonia.

In dog 17, the right main bronchus was occluded. Twenty-four hours later it presented the classical clinical symptoms of atelectasis, the heart being completely to the right and the lung more cloudy

FIGURE 3



(fig. 3). The same phenomenon can be obtained at will on either side.

There are a strikingly great number of points in common between lobar pneumonia and massive atelectasis.

The more important are:

- (1) The lobar distribution.
- (2) The rapid onset of symptoms.
- (3) The almost identical clinical symptoms, except for the more toxic element in pneumonia.
- (4) The very rapid improvement after release of the obstruction in atelectasis, and after the crisis in pneumonia.
- (5) The more usual localization in the inferior lobes, particularly the right.
- (6) The X-ray findings.
- (7) The gross pathology and histology.

The problems we were confronted with at the beginning of our experimental investigation on pneumonia were chiefly two:

- (1) Why is there in lobar pneumonia a lobar distribution exactly as in massive atelectasis?
- (2) If lobar pneumonia be due to a similar mechanism, there should be at least at its onset signs of an atelectasis which must be revealed by X-ray.

In the literature we found no explanation for the lobar distribution of pneumonia, though several authors have conceived the necessity of another cause besides the presence of pneumococci in the bronchi for determining the development of lobar pneumonia as, for example,—the influence of cold, nervous reflex, etc. Other authors have noticed in autopsies on pneumonia the occlusion of large bronchi by tenacious mucus. Blake and Cecil ³ working on monkeys have shown that in pneumonia the lesions start at the hilar part of the lobe, and that when this portion presents red hepatization the smaller bronchi are still sound. Another fact of importance is that the most frequent agent of lobar pneumonia is the pneumococcus which

is precisely the greatest fibrin producer of the group of micro-organisms known to produce pneumonia. Furthermore, Chevalier Jackson and his associates have prevented or cured so-called diphtheritic pneumonias by careful bronchoscopic aspiration of the membranes. All these facts taken together offered valuable *a priori* support to our surmise that lobar pneumonia possibly owes its localization to the obstruction by mucus or exudate of a bronchus supplying a lobe. We therefore tried to find out whether signs of atelectasis were present in experimentally produced pneumonias, figures of which are later shown.

It is generally known that a differential diagnosis between postoperative massive atelectasis and postoperative pneumonia may be very difficult. Thus some report atelectasis complicating pneumonia or the inverse, pneumonia complicating atelectasis. Very often in cases of obscure postoperative lung complication the consulting medical man states that the case is clinically a pneumonia, but not typically so, because of the lack of toxic symptoms. In other cases, from the case history alone, it is impossible to state whether the disease has been massive atelectasis or pneumonia. True lobar pneumonia may occur in children with unquestionable signs of atelectasis as in the cases of Thoenes, St. Engel, Wallgren and Griffith. Griffith⁴ denies the presence of signs of atelectasis in his case. We, on the other hand, believe that shifting of the heart and mediastinum and elevation of the diaphragm signifies but one thing: Decrease in size of the affected lobe with compensatory distention of the good lung—in other words, massive atelectasis. In text-books of pathology, the affected lobe seems larger than normal; likewise in a photograph of a specimen of a right pneumonia of a monkey's lung (fig. 4). However, the true size relations are different as we have observed in experimental atelectasis and lobar pneumonia. The true relations in size may be obtained by first clamping the trachea before removing the lung from the chest, as in dog 28, which had a right lobar pneumonia (fig. 5).

FIGURE 4

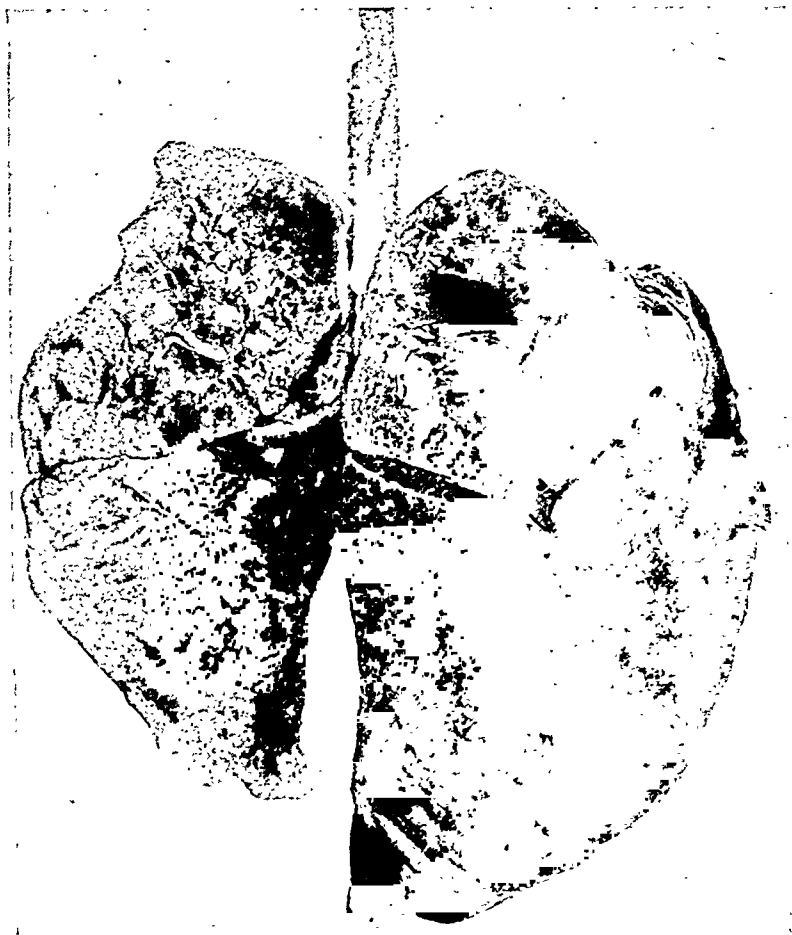


FIG. 4.—Right lobar pneumonia in monkey's lung (After Blake and Cecil).

FIGURE 5



FIG. 5.—Right experimental lobar pneumonia in a dog's lung. The trachea has been clamped before opening the chest.

Even with the trachea clamped, the good lung decreases in size, because of diffusion of the alveolar air, and in a short while becomes even smaller than the affected lung. With no clamp, the good lung collapses immediately and an erroneous impression may be gotten.

Our experimental work has been carried out in dogs because of the flexibility of the mediastinum. With a Jackson bronchoscope, a nineteen to twenty-two hour old broth culture of pneumococcus type I, supplied by the Bellevue laboratory of Dr. Russell Cecil, was insufflated into the desired bronchus. Such culture in one to a million dilution in 1 c.c. amounts, killed white mice in twenty-four to seventy-two hours. The dogs were examined as to clinical signs, X-rays taken one, two or more times a day, blood counts and cultures taken every day, and post-mortem findings carefully noted. Using 10 c.c. amount of culture, we obtained negative results in about 20 per cent. which is proof that the volume of fluid alone is not sufficient to give an atelectasis.

Dogs insufflated with 15 c.c. of culture of low toxicity did not develop pneumonia or atelectasis, showing that the volume of fluid alone insufflated is not the factor determining atelectasis.

Finally, a short summary of a human case of pneumonia is given. So far as we know, it is the first instance where bronchoscopy and bronchial aspiration has been done in pneumonia from the therapeutic point of view.

We shall simply state here, subject to further development in another paper, that the continuous raising of rusty sputum during the disease in humans is not in variance with our theory, because the sputum has its origin in the bronchi and major bronchioli and not in the alveolar air sacs, atria or small bronchioli.

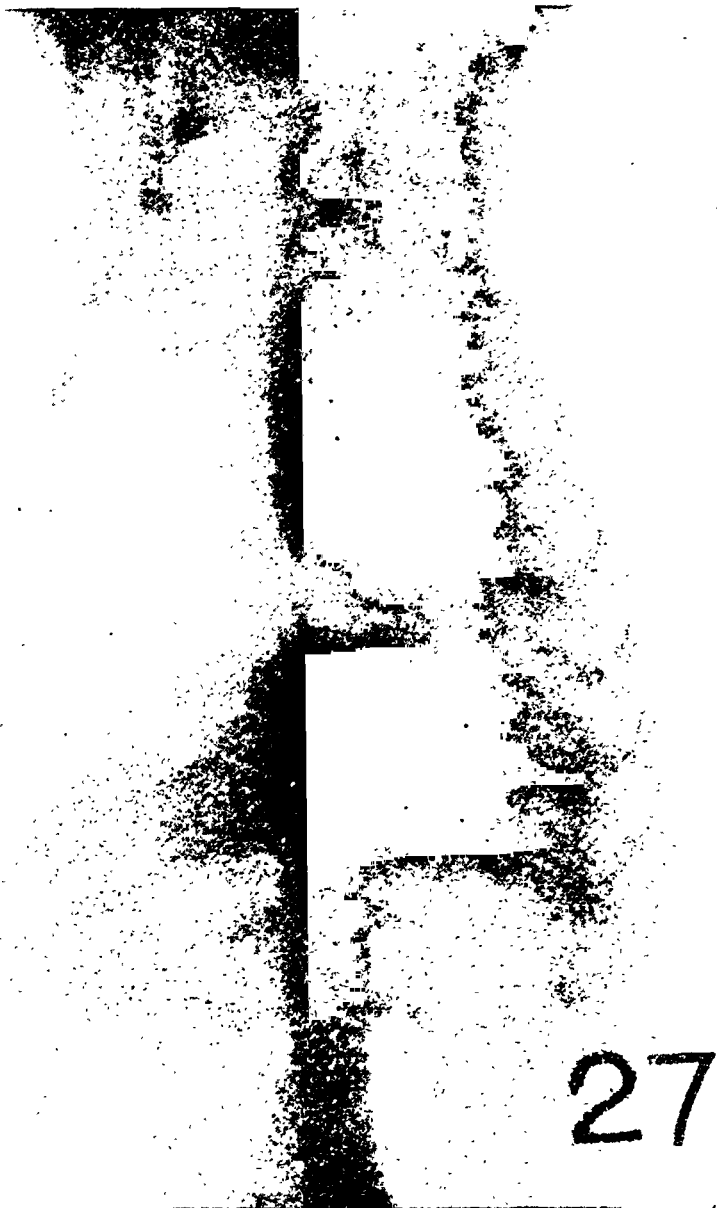
Dr. Lewis A. Conner and Dr. J. D. Kernan kindly cooperated with us and procured the clinical data and the bronchoscopic examination of the patient.

FIGURE 6



Dog B5 had 10 c.c. of culture insufflated into right bronchus. Twenty-four hours later T. 104° , P. 160, R. 72; it was very sick and dyspneic. Blood count 13,850, blood culture positive for pneumococcus. X-ray shows heart displaced to the right, right diaphragm markedly elevated (fig. 6). Forty-eight hours later X-ray shows no change. The same day, fifty-two hours after insufflation, no change. Dog died four hours later. Autopsy: Pneumonia of all right lobes, so-called "stage of red hepatization." Microscopic section typically atelectatic with beginning exudate into alveoli.

FIGURE 7



Dog B27 had 1 c.c. of culture, representing the sediment of 12 c.c. of centrifuged culture, insufflated into its left main bronchus. Twenty-two hours later, complete pneumococcic atelectasis (fig. 7). Left bronchus aspirated, and 5 c.c. of viscid fluid removed. Animal died shortly after with positive blood culture and marked leukopenia, W.B.C. 2,400, polys 94 per cent. Lungs airless, bluish-red, stage of "red hepatization."

E. F. male, 23, was admitted Dec. 29th, 1927, 7 P. M. to the New York Hospital, on the medical service of Dr. Lewis A. Conner.

Relevant history: Two weeks before admission patient developed a slight "cold" characterized by mild rhinitis occasional cough which was slightly productive of mucoid sputum. On Dec. 27th, at 8 P. M., (forty-eight hours before admission) he suddenly developed a "shaking chill" lasting half an hour, followed by feverishness, malaise, bodily aches and increased cough. On Dec. 28th at 3:30 A. M. he vomited three times; later the same morning he coughed up blood-tinged sputum and "noticed a stitch in the left side on deep breathing." He then decided to enter the hospital.

Physical exam.: Patient appears acutely ill, face slightly flushed, respiration increased; coughs up a frothy orange colored sputum.

Chest: Heart normal, apex in 5th interspace 9 cm. to left of sternum.

Lungs: Right lung normal.

Left lung: Anteriorly the percussion note is resonant with suggestion of tympany. Posteriorly the note over the lower lobe is very dull. Over the dull area the fremitus is increased, with bronchophony and increased whispered voice. The breath sounds here are bronchial in character; occasional crepitant rales are heard. Sounds suppressed in axilla.

Rest of physical examination essentially negative.

On admission, T. 103.6°, P. 94, R. 30. Blood count 23,000 white cells, 97 per cent. polymorphnuclears. Sputum showed pneumococcus type III. X-ray at 8:40 P. M. on night of admission showed increased density throughout practically the entire lower left lobe; heart in mid-line, left diaphragm slightly higher than the right; trachea deviated slightly to the right. At 8 P. M. the same night bronchoscopy was done by Dr. J. D. Kernan. A 9 mm. bronchoscope was passed down the left bronchus with the

aid of cocain anesthesia. The first posterior root of the inferior bronchus was found to be occluded with thick tenacious rusty-colored exudate. No air was seen entering or leaving this bronchus, though an occasional bubble of air would come from the mass of viscid exudate. Approximately one teaspoonful of this material was aspirated. The other roots of the inferior bronchus, the bronchus of the other left lobe and the main bronchus were normal in appearance.

Progress Notes:

Dec. 30th (day following bronchoscopy): No untoward signs following bronchoscopy. Some signs of consolidation in left lower lobe anteriorly. T. 104°, P. 100, R. 25. General condition good. Blood culture negative.

Dec. 31st. Signs of consolidation present in left lower lobe. General condition good. T. 104°. X-ray shows no marked change.

Jan. 1, 1928. Temperature started to fall yesterday, forty-three hours after bronchoscopy, reaching normal within twelve hours. Crisis started within less than four days after onset of disease.

Jan 2nd. Blood count normal; advent of small moist rales in affected lobe.

Jan. 9th. Chest clear by physical and X-ray signs.

Jan. 13th. Discharged cured.

SUMMARY

In a brief way, a resumé has been given of considerable data accumulated on experimental pneumonia in dogs. The similarities between lobar pneumonia and massive atelectasis have been pointed out. In our opinion the sequence of pneumonia is as follows: In the course of a pneumococcic infection of the bronchial tree, occlusion of a lobar bronchus occurs and this starts the syndrome called lobar pneumonia. This obstruction is effected by the viscid fibrinous bronchial exudate, aided perhaps by edema of the mucosa and possible damage to the ciliated

epithelium. We always found a brownish, viscid substance in the affected bronchi of our animals, which died of "lobar pneumonia." The lung was bluish-brown, airless, and section showed gradations from atelectasis to "red hepatization," as the latter appears in dogs.

In massive atelectasis the bronchus is often occluded by a relatively poorly infective secretion, and the toxic symptoms are absent; whereas in "lobar pneumonia," the viscid occluding secretion is infected with pneumococci from the start, the number and virulence of the microbes determining the degree of toxicity of the disease. The obstruction having once set in, absorption of alveolar air proceeds; simultaneously the infection is spreading to the periphery of the lobe by the septal and interalveolar lymphatics. Absorption of endotoxins in pneumonia explains the toxic element which is usually absent in simple atelectasis, but which can occur in the latter, if it is secondarily infected with pneumococcus, in which case we will have a post-operative pneumonia.

CONCLUSIONS

From the experimental and clinical facts, we have come to the following conclusions:

- (1) Pneumonia in dogs presents the same X-ray signs and pathological findings as massive atelectasis.
- (2) The two diseases are similar in their main clinical features. They differ in their degree of toxicity.
- (3) Microbes are always more or less present in the obstructing bronchial secretion, in simple atelectasis. When virulence of these microbes is high, the toxicity of atelectasis approaches or even surpasses that of pneumonia. When the infecting agent is pneumococcus the disease then becomes identical with so-called "lobar pneumonia," and no differentiation is possible.
- (4) Lobar pneumonia is a pneumococcic massive atelectasis of the lung.

- (5) Bronchoscopic liberation of the occluded bronchus has already given conclusive results in massive atelectasis and even in postdiphtheritic pneumonia. If we are right in the interpretation of the experimental and clinical facts presented, bronchoscopic aspiration in pneumonia, at least in the earliest stages of this disease, would be indicated. It is too early as yet to give definite conclusions concerning such therapy, but its employment, at least in early cases of lobar pneumonia, should merit the consideration of the clinician.
- (6) A human case has been bronchoscoped and the findings corroborated our experimental observations. The bronchus corresponding to the affected lobe, and only this bronchus, was occluded by mucous exudate.

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We wish to express our great appreciation to Drs. Russell Cecil, John C. Torrey and Morton Kahn, for their kind suggestions and help, and to Miss Dorothy Rhoades and Miss Elizabeth Montu of their laboratories for their kind coöperation.

ABSTRACTS OF PAPERS DELIVERED AT SECTION MEETINGS

Section of Pediatrics, January 12, 1928

ENDOCRINE GLANDS IN RELATION TO INFANCY AND CHILDHOOD

(ABSTRACT)

LEWELLYS F. BARKER

Baltimore

The topic is of interest to pediatricists: (1) Since some of the disease-syndromes of infancy and childhood are due to excess or deficiency of products of the endocrine glands, (2) since the metabolic processes and the activities of the vegetative nervous system are subject to endocrine regulation, (3) since early development, both mental and physical, are influenced by the increta and (4) because human constitutions appear to differ markedly in endocrine make-up. But it should be emphasized that though the facts in endocrine domains are interesting, the fancies that are prevalent are almost too fascinating. Real progress is being made in endocrinology; even its errors through stimulating further researchs are leading to the discovery of new truths.

Of the clinical syndromes of probable endocrine origin interesting to pediatricists, the more important are (1) Graves' syndrome or hyperthyroidism, (2) hypothyroidism, (3) tetany (manifest and latent, (4) gigantism, (5) dystrophia adiposogenitalis, (6) diabetes insipidus, (7) status thymicolymphaticus, (8) hypoadrenia (9) pseudo-hermaphrodisim, (10) premature puberty, (11) eunuchoidism, and (12) diabetes mellitus. The paper dealt with the more important features of these syndromes in the early ages of life.

Comment was made upon the use of autacoid substances as pharmaka, and the uses in the therapy of childhood

diseases for thyroxin, epinephrin, pituitrin, insulin, and parathormone were briefly described. A warning against the abuse of these new remedies was sounded, since they are powerful agents capable of producing dangerous reactions unless most cautiously administered.

The relations of endocrine studies to the newer concepts of the psycho-physical constitution were next considered. Though neural and hormonal influences are important in the integration of developing constitutions, it should not be forgotten that the nervous system and the incretory system are, themselves, genotypically determined, even though they may be to some extent modified by paratypic influences as phenotype succeeds phenotype in the development of single persons. The importance of fostering the studies now being undertaken in so-called "constitution clinics" was pointed out; only after these and other researches have been pushed much farther can we hope to give any specific meaning to what is sometimes referred to as the "endocrine formula" of a human constitution! Attention, too, should be focussed upon the very important studies upon the effects of very early injuries to developing organisms upon their subsequent history.

February 9, 1928

THE KETOGENIC DIET IN EPILEPSY

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Boston

Until further investigation has provided us with an absolute standard, somewhat arbitrary criteria must serve as indications of the effectiveness of treatment in epilepsy. To permit satisfactory comparison of different studies, the same criteria should be used by all investigators. I shall therefore in this discussion employ the standards used by Helmholtz for "complete relief," "improvement," and "failure."

The ketogenic diet, of which Wilder first conceived, has been used during the last six years in several clinics in the treatment of epilepsy. Although none of its advocates have claimed that it cures the basic abnormality, those who recommend the diet realize that it may in some way affect the underlying cause of epilepsy. This is suggested by the permanence of the relief which seems to follow a course of treatment in some cases. The results of ketogenic therapy in different hospital clinics are surprisingly uniform. Epileptic seizures disappear completely in about 33 per cent. of all children treated. The proportion of adults who are thus entirely relieved is smaller, for mature individuals seem to respond less readily than children. A few do, however, find that strict adherence to the diet brings complete relief and a large number have much less severe symptoms during the ketogenic regime.

That the effectiveness of the treatment probably depends in part at least on the nicety with which the diet is adjusted is suggested by the few data compiled in Table I. The percentage of complete relief in the children in the Research Ward of the Massachusetts General Hospital is just twice that found in the usual clinic. The results obtained in the Children's Ward are similar to those published by Peterman and Helmholz, and those seen in private practice are somewhat more encouraging. The discrepancy in the percentages cannot be ascribed to great differences in the methods employed, for in all groups the same principles of therapy were followed. In private practice, and particularly in the Research Ward of the hospital, however, more detailed attention and care can be given than is possible in a large clinic.

Just how and why the ketogenic diet exerts its beneficial effect is not known in spite of careful investigation of many of the metabolic changes induced. The improvement in symptoms which accompanies both fasting and administration of this special diet is associated with acidosis, ketosis, lowering of the sugar content of the blood, and a diminution of the alkaline reserve. Each one of these factors has

been separately studied with the hope of finding an explanation for the effectiveness of the treatment, but without avail. Mineral acidosis induced by the administration of ammonium chloride does not exert the desired effect; slight lowering of the blood-sugar-content by means of insulin is not followed by definite improvement, and administration of sufficient doses to reduce the content to 40 mg. per 100 c.c. brings on almost continuous convulsions which are relieved by glucose;* administration of bicarbonate of soda does not induce attacks in our patients as it would if a shift of the acid-base equilibrium toward the alkaline side were the critical factor. With these possibilities ruled out, we are still completely in the dark as to whether there is any etiological connection between epileptic seizures and metabolism.

Wilder's hypothesis, that the anesthetic action of acetone may be responsible for the improvement which follows ketogenic therapy, still remains and deserves consideration. Parsons in his experiments in the Children's Clinic at the Massachusetts General Hospital has confirmed the long-recognized fact that this substance has depressing properties similar to those of ether. In his rabbits acetone caused unconsciousness, complete anesthesia, and, in large doses, death. These symptoms disappeared completely on intravenous injection of 10 per cent. glucose solution and death was averted by the same means. Although this anesthetic action of acetone explains more satisfactorily than any other factor the results obtained, it does not throw light on the greater sensitiveness of certain individuals to given degrees of ketosis and on the discrepancy between the response of adults and that of children to dietary treatment. Neither does it suggest a reason for the apparently complete and permanent relief of symptoms in certain children even after the return to a non-ketogenic diet, and the reappearance of symptoms in other children before ketosis has completely disappeared.

*Metcalf, Kenneth M., and Moriarty, Margaret E.: Unpublished data from Children's Medical Clinic, Massachusetts General Hospital, Boston.

Before discussing in detail the essential constituents and the administration of the ketogenic diet, it may be well to point out some of the general non-specific effects of this type of treatment when it is properly adapted to the individual. Maintenance of marked ketosis for months does not seem to injure the general health, and in most epileptic patients is accompanied by constitutional improvement. The susceptibility to current infections appears to be reduced, and the resistance to all types of sickness seems to be greater. Children continue to gain weight normally and are not stunted in their growth. In other words, maintenance of an apparently abnormal diet in epilepsy just as in diabetes establishes a condition of general well-being.

The preparation and administration of the ketogenic diet requires special knowledge just as does the use of the diabetic diet. It is not sufficient to tell the patient to eat a lot of fat and to omit carbohydrate food. Specific directions must be given about the weight of each article of food, and punctilious watchfulness must be maintained to ascertain that without exception the patient receives the exact quantity prescribed and nothing else. Small aberrations retard improvement disproportionately. Since physiological adaptation to change of any sort cannot take place instantly, the shift from a normal to a ketogenic diet should be gradual. The intake of ketogenic substances should increase as the intake of antiketogenic material is reduced. Because the mathematics involved in Schaeffer's molecular ratios is so complicated, and because in actual practice molecular ratios do not differ markedly from gram-ratios, the ketogenic-antiketogenic proportions of the diets used in the clinic at the Massachusetts General Hospital and in my private practice are calculated on a basis of weight. Protein and carbohydrate are considered antiketogenic and fat ketogenic. Since the ketogenic-antiketogenic ratio of the usual normal diet is 1:4 and the best therapeutic results in epilepsy are not obtained until the ratio has approached 4:1, there must be several stages between the beginning of treatment and the establishment

of a fully effective regime. The digestion requires time for its adjustment to the lack of carbohydrate and protein and the presence of large quantities of fat. Too rapid change results in abdominal discomfort, nausea and other symptoms of indigestion. These disturbances usually yield in a short while to simple therapeutic measures without any shift of diet, but it is preferable, of course, to make the change to the ketogenic regime without inducing such upsets.

The technic used with the patients here discussed is identical in principle with that of Peterman and Helmholtz, but differs from it in detail. No period of complete fasting precedes the alteration in the food intake, but the shift from one type of diet to the other is made gradually. Luther's working table (Table II) is of great value during this period of adjustment, for it permits easy calculation of the ketogenic-antiketogenic ratio of any diet containing 1000 to 2500 calories. It is usually best to change the proportions of the diet from normal to $1\frac{1}{2}:1$, and thereafter to follow the sequence of $2:1$, $2\frac{1}{2}:1$, $3:1$, $3\frac{1}{2}:1$, $4:1$. Occasionally, some of the stages can be omitted when it is essential to induce ketosis quickly or when the patient has a very strong digestion. The response to the diet varies greatly in different individuals, and can be determined by chemical tests. Early ketosis is revealed by the presence of acetone in the breath (Higgins' method) and may appear while the ratio of the food constituents is $1\frac{1}{2}:1$. The sodium nitroprusside test in the urine does not become positive until the ratio of the diet is $2:1$; and the ferric chloride test remains negative until the proportions reach $2\frac{1}{2}:1$.

In planning the ketogenic diet it is essential to consider the caloric content of the food, the protein needs of the individual, and probably the effect of ketosis on the mineral metabolism of the body. The number of calories should be such that the ideal weight may be maintained and growth may continue normally in children. If the proper adjustment has been made underweight children will at

first gain rapidly in weight, and obese children will lose. Weekly determination of the weight demonstrates clearly whether these qualifications are being fulfilled. The average child needs about 50 per cent. more than the calculated basal caloric requirement for an individual of the same height and age, but variations in activity make it impossible to determine the correct intake without careful checking. Table III gives the average caloric requirements, and has in our studies proved to be a satisfactory working basis. It cannot be followed blindly, however, for a patient whose physical development is above the average requires more calories than one who corresponds exactly with the standards. The caloric intake must be adjusted to the developmental age and to the activity of the individual. That of physically active children must be more nearly maximal than that of children who take but little exercise (Chart I). Many observers, however, prefer Peterman's method of calculating the requisite number of calories. He gives a diet containing 30 calories per pound of body weight.

Concerning the protein needs of the body there has been much speculation. Recent investigations have suggested that small amounts of protein in the food suffice for growth and ordinary wear and tear, but the requirements have not yet been accurately determined. It is well recognized, however, that an effective ketogenic diet (ratio 4:1) contains so little protein that there is danger of failing to supply the minimal demand. Bartlett's work on diabetic children seems to indicate that 1 gram of protein per kilo of body weight is sufficient. Peterman administers this quantity to children less than five years of age, and $\frac{2}{3}$ of a gram per kilo to those who are older. The technic at the Massachusetts General Hospital has been to give about 1 gram per kilo to children of all ages. This appears to be sufficient before the ketosis is marked, provided the total food intake is adequate. Thereafter the nitrogen balance may become negative (Chart II, Tables IV and V).

Just how long and to what degree fat can replace carbohydrate in the metabolic processes is not known. It does supply calories and to some extent prevents inroads on the body protein, but it is very improbable that it can duplicate in full the protein-sparing action of carbohydrate. In order to discover the effect of a high-fat-low-carbohydrate diet on the retention of protein the intake and output of some of our patients has been determined. The data obtained show that during ketosis a positive protein balance is not maintained in children more than eight or ten years old until the intake is about $1\frac{1}{4}$ grams per kilo of *expected body weight*. This suggests that in the long run the amount of protein in the diet should be larger than has previously been thought necessary. No available evidence indicates the damage done to the body by persistence of a negative nitrogen balance, but it is reasonable to suppose that an indefinite quantity of protein cannot be lost without real injury of some sort. Consequently it is very desirable to determine the balance from time to time during dietary therapy, and almost essential to do so when the diet is extreme in any way. This can be done in private practice as well as in hospital clinics. We have made it a routine procedure to analyze the urine quantitatively for nitrogen at intervals during treatment, and on the basis of the results obtained to vary the diet so that the balance is positive. Daily examination has, however, demonstrated that the excretion varies greatly from day to day even when the intake is constant, and that single determinations have no significance (Table VI).

Certain factors other than the action of carbohydrate and fat seem to affect the retention and availability of nitrogen in the body. The physiological properties of animal and vegetable proteins are not identical, and gelatine and the substances which break down into the amino acids seem to act differently. The reason for this is not known.

The mineral requirements of man are comparatively little understood. Gamble's work shows that ketosis increases the calcium excretion, a fact which must not be

forgotten in the administration of the ketogenic diet. This is not disproved by the observation that the calcium-content of the blood remains stationary during ketogenic therapy, for Aub has found that the rate of calcium excretion may markedly increase while the blood content remains normal. Consequently until the conditions are exactly understood it seems reasonable to avoid the danger of decalcification of the skeleton by giving small doses of calcium lactate (2-3 grams daily) during prolonged ketosis. Inclusion of adequate quantities of calcium in the food is impossible when the fat ratio is very high, because sufficient amounts of milk would upset the proportions of the diet.

SUMMARY

The effects of the ketogenic diet in children have been successful enough to warrant the use of this form of therapy. The diet should contain sufficient calories to maintain the weight, and sufficient protein to prevent loss from the body. The amount needed for this during ketosis is greater than has been generally assumed. The minimal requirements are probably met by $11\frac{1}{4}$ grams of protein per kilo during ketosis. Studies are now under way to establish the minimal calcium requirement during ketosis.

THE KETOGENIC DIET

M. G. PETERMAN

Milwaukee

The ketogenic diet was introduced in 1924 after two years of clinical trial. Wilder, in 1921, on the basis of Geyelin's results with starvation, suggested that diets in which the proportion of carbohydrate and protein were sufficiently restricted might offer a method of treatment of epilepsy. It was on the basis of Wilder's suggestion that the high fat, low carbohydrate, restricted protein diet

was evolved. Studies of patients on this diet and modifications of my original procedure have been reported by me during the past three years. Other investigators have reported results in the treatment of epilepsy with the ketogenic diet, but there have been no modifications of my procedure, nor have there appeared any other original explanations of the action of the diet in its control of epileptic seizures.

In the preliminary report it was suggested that the object of the diet was to produce acidosis. This object was based on the results reported in 1921 by Jarloev and by Geyelin. Geyelin was the first in this country to report the beneficial effects of fasting on epileptic patients, and he ascribed the results to an acidosis produced. Three years later Hoeffel and Moriarty, and Shaw and Moriarty subscribed to the acidosis theory of Jarloev and Geyelin. In 1925 and subsequently it was demonstrated that acidosis alone or ketosis alone do not control the convulsions of epilepsy. Children on the ketogenic diet may be given enough soda to alkalize the urine without provoking attacks. The ketosis is variable during this procedure but usually persists while the acid-base equilibrium is shifted toward the alkaline. A chemical acidosis produced by the administration of ammonium chloride in large amounts does not control the convulsions of epilepsy. With this drug the CO_2 combining power of the blood may be reduced to 20 volumes per cent and the pH of the urine to 5.4. The fat in the diet may be substituted with "intarvin" until the acetone bodies disappear from the urine or are considerably diminished and still the patient be kept free of attacks. However the effect of pyruvic acid, the incomplete oxidation product of intarvin, is not known. Authors should be more careful to distinguish between acidosis and ketosis. It has been demonstrated that the ketogenic diet produces a ketosis in which the acetone bodies may be increased from two to forty times normal. This increase is evident in the blood, urine, alveolar air, and probably throughout the tissues. There is usually a slight fall in the alkali reserve or a decrease in the CO_2

combining power of the plasma but not below the limits of normal. Talbot and his co-workers in their report still favored our original acidosis theory but in their conclusions they agreed with our subsequent ideas on the predominant effect of the ketones. McQuarrie and Keith have recently subscribed to this proposal. They have also further substantiated our earlier demonstration that the degree of ketosis is a factor in the control of epileptic seizures. The fall in blood sugar is not always great or consistent. The normal variation of fasting blood sugars is well known. In ketosis the level is dependent on a number of factors including the storage of glycogen before ketosis; the degree of ketosis; the total caloric intake; individual susceptibilities; and rate of absorption. Brown and Graham, McQuarrie and Keith, and others find no consistent decrease. There is no change in the calcium, phosphorus, chlorides, or non-protein nitrogen of the blood. There is also no change in the number of blood cells or in the sedimentation reaction. The effects of the ketogenic diet as outlined above are not, as suggested by McQuarrie and Keith, "entirely similar to those of fasting." It has been sufficiently demonstrated that in ketosis the acetone bodies are increased in a much higher proportion and that they persist for longer periods. There is also not the marked decrease in the CO_2 combining power of the plasma, nor the change in the pH of the blood.

Section of Surgery, February 3, 1928

THE EXTENSION OF THE SURGERY OF
NEOPLASTIC DISEASES BY
ENDOTHERMY

(ABSTRACT)

GEORGE A. WYETH

Some seven years ago the writer, dissatisfied with the results obtained in the surgery of malignancy, and moved by Doyen's conclusion that: "Of all means employed in the destruction of pathological lesions the only certain method is that of heat," went to electrotherapy to find the best method of inducing heat in the tissues.

There was a rich literature devoted to the methods and results of the application of high frequency currents to disease and, although considerable patience was needed to untangle the confused nomenclature of its presentation, the investigator was repaid by the findings of accomplishments covering a period of more than twenty years.

Doyen and Nagelschmidt had demonstrated so long ago the high value of electric coagulation in the destruction of malignancy. Clarke, of Philadelphia, had for more than fifteen years, used with brilliant success the lighter current to accomplish that desiccation by which lesions of the more delicate tissues may be destroyed without injury to surrounding areas. It was impossible to doubt the authenticated results which these men and many others presented—results far outweighing the unwarranted claims by which less scientific students had brought criticism upon the whole field of electro-therapeutics.

Our own interest in what has been developed as endothermy was greatly stimulated by our experience with a case of tumor of the bladder. The usual suprapubic incision was made by the scalpel. The growth was exposed by electric light in the bladder and was desiccated in situ

and removed. The bladder was then sutured in the usual way, without drain. After three months, cystoscopic examination showed the site of the lesion so free that it was difficult to be sure just where the growth had been. Along the line of the scalpel's incision, however, were three carcinomatous nodules. There could not be a more graphic picture of the beneficent action of the high frequency current as contrasted with the scalpel's lack of protection against the implantation of malignant cells. The need of perfecting a cutting current which should extend surgery's usefulness as a weapon against neoplastic growths seemed urgent.

From the realization of this need the perfected cutting current, the endotherm knife, was developed and presented before the Surgical Section of the State Medical Society in Rochester, April, 1924. In reporting our work tonight, we realize that it is not conclusive. Sufficient time has not yet elapsed nor have we had a sufficient number of cases for us to offer final results. The work is, however, indicative and on this ground it is presented.

As we hereafter discuss the methods by which results are achieved it will be observed that a sound surgical training is the basis of its successful employment. But equally important is a thorough knowledge of the precise use of the currents for they differ widely in character and effect.

In the treatment of localized malignancy which can be immediately removed we no longer use X-Ray or radium. They are time-consuming, uncertain in action and in this type of case should not be employed.

Recent knowledge and Broders' classifying of neoplastic growths on the basis of cell differentiation or degree of malignancy have shown the folly of generalization in treatment. Although surgery still remains the cancer sufferer's chief hope, it is as wrong to cut all cancers as it is to treat all cancers by physical measures. Grades 1 and 2, being less malignant, are more responsive to treatment and can be reached by a wider range of curative measures than can Grades 3 and 4, which offer far less hope if attacked solely

by conventional means. The value of this to the patient is very great. So many cases of cancer, however, are already beyond the reach of the scalpel when first seen by the surgeon that there is urgent need for a new method. To illustrate:

In 1925, Simmons of Boston, reporting from the Collis P. Huntington Memorial Hospital, found that of 103 cases of carcinoma of the tongue who applied for treatment, 76 were inoperable. Similarly, Judd and New, of the Mayo Clinic, reported that of 303 cases of carcinoma of the tongue which came under their observation between January 1, 1910, and January 1, 1922, 186 (61.05 per cent.) were inoperable. To seek to limit the number of these so-called inoperable cases merely by urging early examination and earlier operation is not enough. There is need of an extension of surgery's applicability that will not only reach a much larger percentage of cases as they apply but will reach them with more lasting benefit.

Judd has since said: "For growths too extensive for radical surgical removal diathermy offers the best prospect." We go further and suggest that a remedy which offers the best prospect in cases too extensive for scalpel removal offers also the best prospect in cases not too extensive for scalpel removal.

In endothermy we have three procedures:

To desiccate the malignancy; to coagulate the malignancy; or to excise the malignancy with the endotherm knife which seals lymphatics as it cuts. There is also a technic of combining the use of the coagulating and the cutting currents to make possible the destruction of malignancy *in situ* and its excision as a dead mass, instead of as a group of viable cells. This greatly reduces the danger of metastasis and the likelihood of recurrence, and the operation can be done without hemorrhage. These several procedures are not interchangeable; each has its own indication and should be learned and used accordingly.

It is in the field of mouth carcinoma that endothermy finds its greatest usefulness. Danger of mechanical transplantation is minimized, hemorrhage and surgical shock are eliminated and there is an immediate sterilizing effect of intense heat upon the foul, painful area which permits the early return to normal diet. In all cases of cancer of the oral cavity we realize that the great problem lies in the neck. In the brief time allotted to this paper there can be no discussion of detailed treatment. We would only say that our experience has lead us to share the view of Mr. Clayton-Greene and his English confreres. Mr. Clayton-Greene says: "I am becoming more and more doubtful as to the value of big gland dissections practised in cases of carcinoma of the tongue. If the glands are not involved the operation is unnecessary and if they are extensively affected it does not seem to prevent recurrence."

To those exceptional cases, melanomas and the various malignant lesions which by their very extent or by the depth of their involvement must be classed as inoperable by any careful user of the scalpel, endothermy greatly extends surgery's usefulness. Its results cannot be dismissed as the accomplishment of a cautery and endothermy should not be spoken of as cauterization. There is no burning. The applicator is always cold when applied, the heat coming from within the tissues in response to the many oscillations of the high frequency current.

In tumors of the breast endothermy finds further opportunity for service. In the very early cases of breast tumors, where there is but the presence of a suspicious nodule, we use a very fine needle for the cutting current and incise down to the small tumor. Gradually elevating it by working around it, we remove the nodule without opening the lymphatics. We are thus enabled to make definite microscopic diagnosis without jeopardizing the patient through mechanical dissemination. In discussing radical amputation of the breast with the endotherm knife and without ligatures, Kelly of Baltimore welcomes changes

which tend to shorten the length of the operation and decrease the handling of the wound while protecting the patient from the likelihood of infection and the dissemination of tumor cells. He says: "We believe we have such an improvement in the radical breast operation in the new endotherm methods."

In advanced carcinoma of the breast, particularly of the fungating variety, by the combined technic of bipolar endotherm and the endotherm knife we perform a two-stage operation, which isolates and immediately removes the offending part first and, later, cleans out the axilla and cares for the supraclavicular space.

There is time to speak but briefly of the cases of malignancy located in cavities which may be made accessible, such as malignancy of the antrum, larynx, bladder. One would say in general that it is our custom to open the cavity with the endotherm knife, expose the neoplastic growth to full view and proceed to destroy and remove it after the indicated technic of endothermy. Surely one is justified in first offering to his patient this alternative of electrothermic destruction before submitting him to the crippling operation of complete laryngectomy for a beginning carcinoma.

The procedure is a new one and in recommending new methods and the modification of old methods to the attention of the profession we would quote what Dr. Lewis McArthur so effectively said at the meeting of the American Medical Association in St. Louis. Urging upon his colleagues the importance of deviating from accepted surgical axioms and even, in rare instances, operative procedures at variance with established surgical teaching, Dr. McArthur said: "Otherwise surgical judgment is banished and surgery becomes a set of formulas; the surgeon disappears and there remains only the operator."

FUNCTIONAL RESTORATION AS AN ELEMENT
IN FACIAL REPAIR

J. EASTMAN SHEEHAN

Perhaps one ought to apologize for reminding a gathering of surgeons that consideration is to be given to function in any case of surgical intervention. There is some excuse for doing so, however. There is a steadily increasing literature about repairs of various kinds effected in that area of high visibility and I suppose all of us, when we glance at such articles, at once make the comparison between the first and the last photograph with little more in mind than the degree of betterment in appearance that has been attained. Gradually we come to think that the esthetic improvement is the whole object of the procedure; so that if we go on long enough we are apt to fall into serious error as to the quality of the surgery that is demanded, the same error into which the general public is misled by reckless publicity and also by the actual methods of some enterprising people whose practice is very little concerned either with function or with the nature of the tissues with which they have to deal.

The truth is, of course, that function and appearance are very closely allied. One may say that as a rule failure of function is caused by some disfigurement or itself produces disfigurement. And the converse is equally significant; restoration of function conduces to esthetic improvement, and may even, in extreme cases, go far to compensate the patient for such degree of disfigurement as may remain after all possible has been done.

This leads to another consideration. It is axiomatic that any condition of the kind we have here in mind is to be diagnosed in terms of the loss, whether that loss effects tissues or function. But there is more. There may be loss that is intangible without being on that account any less real. Facial disfigurement may carry with it loss of the means to make a living; not because the capacity has been lost but because there is an unwillingness to afford to the

victim the opportunity to work under the view of others. They may be capable of service but they are ineligible for employment. Or again, the person so disfigured may be so self-conscious as to shrink from all normal social contacts, or may be shunned by those whose society would be agreeable. Loss of the prospects of marriage, which is no small matter in some personalities, may be occasioned by what, from the surgeon's viewpoint, might be considered a very minor disfigurement. The face brings into the problem the relation of the individual to society, and while that is not commonly thought of as being within the range of surgical concern, actually it is.

Evidently, therefore, everything within the arsenal of reparative surgery is to be drawn upon, according to the need, with a view primarily to the restoration of function, and the resulting stimulus to ingenuity is one of the things that imports an element of fascinating interest into the handling of every case of this nature.

Let me indicate the variety of these expedients by citing a few instances.

Customarily, we think of blockage of the airways as the only interference with function in relation to the outer nose, and in the same way we think of the septum as the seat of the dysfunction. But there are certain distortions of the columella which materially impede inspiration, and anything that lessens the flexibility of the muscles about the nostrils also constitutes a serious impediment. Traumatic injury frequently so flattens the nasal bones that there must be an alteration in the nature of the posterior channels. As one studies the variety of injuries resulting from a heavy blow on the nose, he comes to see that the best expectation of restoring normal function, not merely the partial function associated with the passages nearest the septum, is to be realized by restoring all the elements of the outer nose as nearly as possible to the normal positions. So there is an advantage in separating the nasal bones at the maxillae and raising them to the old level, as also in reducing the size of the hypertrophied lower lateral

cartilages. It is a fortuitous coincidence that the excised morsels of the alar cartilage serve very nicely to prolong the new line of the dorsum established in the upper quadrant by raising and re-aligning the nasal bones. There is undoubted satisfaction in observing the gradual reconstitution of the nose as the septum, columella and tip are restored by simple expedients, but there is still greater satisfaction in knowing that the better the nose looks after these readjustments the better is the functional restoration also.

Or suppose we consider the conditions in the orbit from which, in whatever manner, the eye has been removed. In the normal state, the eyelids are insured freedom of action by the flexibility of the conjunctival membranes. Destruction of these results in adhesion between the elements within and without the orbit, and so long as that condition persists there cannot be even a semblance of function as regards the lids. But once an epidermic graft, properly cut and properly placed, has been substituted for the conjunctival sac, the lids can be made to regain their mobility. If the nerves of the lids have been conserved, as very often they can be, the lids, after any number of devices for repair have been completed, may function almost as well over a prosthesis as they did over the eye itself. That account may sound like a commonplace of the clinic, but for the patient there is the additional interest that he is no longer refused employment because of his repulsive appearance.

In this region of the orbit there are two conditions nowadays encountered with rather disturbing frequency. One is the typical windshield wound, the other the typical knife wound as developed by the antagonisms of certain city groups with the old world traditions. In both instances vertical incision of the strands of the orbicularis muscle conduces to lagophthalmus as well as producing disfigurement. A very delicate plastic procedure indeed is the regroupment of the muscle strands across these wounds; but once that is done and the skin cover is returned both the functional and the esthetic restoration has been achieved.

Perhaps it may be interesting to note other instances in which the desire to at least simulate function has led to some manipulation of muscle elements. One patient had suffered loss of all the tissues from and including the angle of the mouth to well outward toward the ear. We succeeded in covering that defect by a double skin flap, one for lining and the other for cover. Joining the lips in that way left much to be desired from the viewpoint of mouth function. This was partly remedied by manipulation of the muscles of the upper and lower lip, giving a pretty fair balance at that buccal angle for the action of the muscles constituting the orbicularis oris at the other angle. Unlike the orbital orbicularis, which is an independent muscle, the orbicularis oris is largely made up of the terminal strands of other muscles, so that by utilizing these other muscles its mechanism can be rather closely simulated. In the case mentioned, this principle was extended a little further, strands of muscle carried down between the inner and the outer skin of the face cover conferring some resiliency upon that part.

In another of these cases, involving, this time, almost the whole of one side of the face, the skin cover was given support by insertion of bands of fascia which, being attached superiorly to the temporal muscle, not only served as a stay to the inert skin tissues but also, as the action of the muscle influenced the fascia, effectively simulated muscle movement on the cheek.

Another very interesting application of the tensile and resilient properties of fascia is in relation to the correction of some of the consequences of unilateral paralysis of the facial nerve. Since the live muscles on one side of the mouth are deprived of the normal antagonisms by which symmetry is established and maintained, distortion follows, with some degree of dysfunction. What is required is to replace the antagonism, and this can be done, with considerable effectiveness, by means of fascia bands carried to locations near the mouth and then drawn up and anchored in the tissues forward of the ear. It is the

restoration of something like a functional balance that underlies the esthetic correction in these cases.

In most of these instances, concern for function is to a greater or less degree incidental. But where, for example, the state of the tissues has produced intractable or even permanent trismus, restoration of function becomes the first of all concerns. The condition is produced by scarred and contracted membrane oftener than might be thought, and the flexibility of the membrane is impaired, it is useful to note, not only by disease but often by the devitalizing effects of the ray or radium treatments by which it is sought to check the disease. One finds, for example, after many such treatments of an angioma, that all the tissues about the growth have been rendered incapable of functioning, only the tumor itself remaining indifferent to the repeated attacks. Extirpation of the tumor is necessarily accompanied by excision of all the useless membrane and its replacement, after release of the trismus, by some material which will not act again to immobilise the jaw. This is another of the many emergencies in which recourse may be had, with all confidence, to the epidermic graft. In practise there is no area too large for it to cover and there is almost no surface on which it will ^{not} take. Sometimes it may be necessary to keep it on for the for a time, to obviate the possibility of shrinking no long effects of shrinking that can be foreseen, but the appeal well spent.

It is hardly necessary to enlarge upon the interference adays elation that is involved in the presence of contractis the ty, whether produced by burns or by other injuries. wound ay, it limits by its presence the functional action groups wanes it overlays, and that action can only be re-vertical ing, the tissues are given a covering under which conduces to rely move. Here we enter the field of skin ment. A ver-neral, epidermic, free full-thickness, tubed groupment of y the other variants. It is a field where once that is dol-kill are demanded, and where the esthetics functional and ti

of the end result are of almost paramount importance. The patient, whose face is to be exposed to the merciless gaze of society, is entitled to the best that can be done for him.

We may leave that phase of the subject with only the remark that unless due regard is had for function the esthetic betterment will not materialize, or will not be permanent, whereas if function is safeguarded improvement of appearance is vastly facilitated.

And may I conclude by suggesting that practitioners of one and another branch of physiotherapy might do well to give a little more thought than perhaps some of them do give, to the probable consequences of devitalizing the tissues with which they have to deal. With the consequences of disease and accident we must expect always to have to deal, but there is surely a momentous significance in the fact that plastic or reconstructive surgery now has to cope with a great variety of dysfunctions and disfigurements that originate in this field of therapeutics.

Section of Neurology and Psychiatry,
February 14, 1928

Symposium on Disorders of the Skin, Heart and
Alimentary Canal Dependent upon Disorders
of the Central Nervous System

SOME CENTRAL CONNECTIONS OF THE
VEGETATIVE NERVOUS SYSTEM

SMITH ELY JELLIFFE

Dr. Jelliffe first spoke of the importance to internal medicine of a knowledge of the structures of the diencephalon. Here are to be found the chief coördinating centers for the vital functions of the human body which underly the *vis medicatrix naturae*, as well as the main regulators of metabolism.

He demonstrated by lantern slides a restricted portion of this important field, showing the main vegetative nuclei and their connections with the rest of the nervous system. He spoke of humoral hypotheses as "autistic thinking." They explain nothing. Only a knowledge of the neural mechanics can show how the body as a transformer and deliverer of energy works. Most important links in this chain are found in the human diencephalon. Bodily health, the sensation of well-being, and definite metabolic functions, such as thermal regulation, electrolyte balance, tissue tension are chiefly controlled at this level of the nervous system. These controls are mostly automatic and beyond conscious control, *i.e.*, they belong to the primitive unconscious processes. There are, however, definite cortical connections in higher animals. These predicate the fact that the automatic processes may be disturbed through higher cortical, *i.e.* symbolic, representations. In this manner it can be seen how "fear" operates to disturb the "well-being" of the body and can interfere with the "*vis medicatrix naturae*." Dr. Jelliffe confined himself to the anatomical substratum of complicated psychical processes.

NEUROGENIC AND PSYCHOGENIC DISORDERS OF THE SKIN*

JOSEPH JORDAN ELLER

The modern dermatologist does not look upon the skin as an organ *sui generis*, diseases of which have no influence on other parts of the body, or vice versa. The skin and nervous system are closely related. In fact, it is through the medium of the nervous system that the skin performs its varied physiological activities. The skin forms the protective covering of the body. Distributed over its surface are nerve fibers of pain, temperature and touch; and the body adapts itself to changes in its environment by means of these fiber reflexes.

Physiologists in the past have taught that the regulation of the body temperature by the skin is effected by the blood supply and sweat secretion. There is a newer point of view regarding the functions of the skin. In an editorial on the sweat glands in the *Journal of the American Medical Association*, February 14, 1925, the statement was made that "the skin plays a significant part in temperature control through its ability to conduct heat and evaporate water." All of the functions of the skin mentioned above are under nervous control.

In a large number of patients suffering from skin diseases one finds pathological changes in other organs; for example, certain skin disorders have a definite relation to organic disturbances of the central or peripheral nervous system. On the other hand, skin patients show psychic changes, varying from slight nervous disturbances to pronounced psychoses.

The epidermis and the central nervous system develop from the ectoderm. Damage to the latter or alterations in its embryonal development might produce changes from the normal in the skin as well as in the central and peripheral nervous system. The skin may be looked upon as

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an organ of sense, which is in continuous contact with the brain, by way of the nervous system. It can thus be seen that certain disturbances of the nervous system, either organic or functional, might produce alterations from the normal in the skin.

In functional disturbances of the nervous system, such as in hysteria and neurasthenia, patients seem easily to be able to simulate or to suggest to themselves, diseases of the various organs, included among which is the skin; and the latter is a favorite location for the complaints of neurasthenics. Secondly, skin symptoms may occur, simultaneously, in a neurotic individual as the result of the neurosis which causes alterations in the gastro-intestinal functions. The sympathetic nervous system is the seat of important functions for the mind as well as for the skin. The internal secretions, whose influence may be conveyed by the sympathetic nerves, may produce mental as well as skin changes, and it is in this way that dermal and psychic diseases often occur jointly as symptoms of the same cause.

It seems at times that there is a connection between psychic alterations and certain trophic and pigmentary disturbances of the skin. This might be explained in the fact that the emotions may exert an influence on the organs of internal secretion, following which endocrine disorder, there may be various pigmentary and trophic disturbances of the skin.

The study of internal secretions and their influence on the psyche and the whole organism have suggested immense explanatory possibilities for a large number of pathological changes, particularly in the skin. Many vasomotor disturbances appear only as an expression of irritation of blood-vessel innervation by hormonal influences. In pronounced emotional states, for instance, there may occur an enlargement of the thyroid gland, hypophysis and increased adrenaline secretion, etc. (Pel, Katsch, and others cited by Gadelius). Strandberg¹ says that a congenital disorder of the autonomic nervous system may

cause various skin diseases produced by trophoneuroses and angioneuroses.

Coincidentally with vasomotor alterations one finds abnormal sweat secretion. In syringomyelia, hysteria, Basedow's disease and other conditions there is often increased perspiration.

It is beyond doubt that the hair may turn gray prematurely by worry and trouble, and there have been reports that hair has turned white over night, following sudden shock. This has been doubted by various observers, among whom are Hebra and Kaposi. Strandberg¹ cites a case of Reinhard, a patient suffering from manic depressive insanity who had alterations of the color of her hair occurring rather regularly. During the stuporous period the color of her hair was light yellow, while the hair became darker, with a golden red tone during the state of excitation. The changes in the color which occurred on the tips of the hairs appeared during the first day of the patient's mental change.

Total loss of hair following traumatism of the central nervous system has been reported in the literature as well as following psychic shock. Strandberg says that psychic factors undoubtedly play a part in certain cases of alopecia areata. He refers to the work of Rock, Poehlmann and Strandberg. O'Donovan,² in his monograph, also attributes a psychic condition as being one of the main etiological factors of alopecia areata. Strandberg quotes a case of total alopecia in a patient with dementia praecox. In relation to the occasional remissions of the mental disease, the hair began to regrow.

Changes in the nails may occur from psychic, as well as from nervous disorders. Oppenheim,³ Strandberg,¹ Heller and others mention this, and Heller⁴ has devoted many pages in his monograph on diseases of the nails to the various disturbances of the nails due to certain diseases of the nervous system.

Heller says that various trophic disturbances of the nails occur, particularly in insane persons. He mentions

that Papillon found nail disturbances in 250 out of 1,050 insane patients examined. Heller observed that nail changes are also frequently found in delirious, epileptic and paralytic patients.

The following table shows the great variety of nail lesions that may result from injury to the peripheral nervous system. This table is founded on the observations of Heller, Cassirir, Oppenheim and others.

GENERAL SYMPTOMS OCCASIONALLY OBSERVED IN THE NAILS AFTER INJURY OF PERIPHERAL NERVES

EARLY STAGE OF NERVE LESION

1. *Hypertrophic Symptoms (increased nail growth)*
2. *Atrophic Symptoms*
 - a. Decreased nail growth
 - b. Thinning
 - c. Falling out of nails
 - d. Loss of lustre
3. *Deformities, such as:*
 - a. Striation
 - b. Bending
 - c. Ridging (longitudinal; transverse)
 - d. Beading (pearl formation)

LATER STAGE OF NERVE LESION

1. *Atrophy of Nails*
2. *Arrest of Nail-Growth*
3. *Decrease in Size*
4. *General Deformity*
5. *Falling out of Nail*
6. *Loosening of Nail*
7. *Ulceration of Nail Walls*
8. *Bleeding underneath Nail*
9. *Ridging (longitudinal; transverse)*
10. *Hardening*
11. *Onychogryphosis*
12. *Fusion of Nail (nail-bed sign—Alföldi)*
13. *Longitudinal and Lateral Curving of Nail*

Among the pigmentary changes which occur in the skin directly or indirectly from psychogenic or neurogenic disturbances may be mentioned vitiligo (or loss of pigment in patches), chloasma (increased pigment in patches), von Recklinghausen's disease, and the changes in pigmentation of areas of the skin affected with scleroderma and other skin diseases resulting from trophoneuroses.

Vasomotor and trophic symptoms of the skin may be found in many insane persons. Acrocyanosis, abnormal hair growth, anomalies of the sweat and sebum secretion have been described by some observers.

The joint occurrence of congenital malformations in the skin (nevroid diseases) and psychic inferiority has frequently been reported. Among some of these conditions may be mentioned von Recklinghausen's disease, adenoma sebaceum, marked ichthyosis, epidermolysis bullosa hereditaria, alopecia congenita, congenital nail changes and extensive pigment anomalies (Strandberg,¹ also Bettmann⁵).

The causes of these combined malformations and psychic abnormalities of the skin are possibly due to injuries of the ectoderm which occurred during fetal life. Consanguinity and degenerations caused by alcoholic abuse and syphilis may play a role in some of these cases.

Various factors influence the blood-vessel tonus, such as the psyche and the vegetative nervous system. These may both be influenced by the internal secretions. When a psychic disturbance affects the blood-vessel tonus, it does this by way of the vegetative nervous system.

Thus it can be seen that it is difficult to classify skin disorders resulting from disturbances of any part of the whole nervous system. Dermatoses which manifest themselves as vasomotor and trophic disturbances do not, as a rule, represent a clinical entity. They are usually secondary to various organic and functional nervous disorders.

The organic lesions of the central and peripheral nervous system are manifold and they may produce various skin conditions. In syringomyelia we find trophic disturbances of the finger-nails and skin of the hands; in tabes dorsalis, perforating ulcers of the feet; in leprosy, trophic disturbances of the skin of the hands, as a result of the involvement of the ulnar nerve; various trophoneuroses and angioneuroses of the skin resulting from traumatism to the brain or spinal cord; etc., etc.

When the organic lesions of the nervous system produce skin manifestations they do this through the interaction of the central and peripheral nervous system and the vegetative nervous system.

Skin diseases of nervous origin are often regarded under two main headings, such as psychogenic and neurogenic. As can be seen from the foregoing, this may easily lead to confusion, for no such sharp distinction can be made. Many of these skin disorders may be both of psychogenic and neurogenic origin. Again, disturbances of psychic origin, in exerting their influence on the skin, do so through nervous pathways. Examples of this are pallor from fright, blushing, horripilation (erection of the hairs of the skin), cutis anserina (goose-flesh), and changes in the sweat secretion. For these reasons, and as a practical working basis, I have put the neurogenic and psychogenic disorders of the skin into five main groups, as follows:—

Group I

SKIN DISORDERS DUE EXCLUSIVELY TO PSYCHIC DISTURBANCES

1. *Dermatitis Factitia* (Mythomania of Dupré)
(deception always practiced) } Various degrees of
dermatitis from a
simple erythema to
the so-called "neu-
rotic" gangrene.

- | | | |
|---|---|---------------------|
| 2. <i>Neurotic Excoriation</i>
(Dermatothlasia)
(no deception intended) | } | Compulsion neuroses |
| 3. <i>Trichotillomania</i> | | |
| 4. <i>Trichokryptomania</i> | | |
| 5. <i>Dermatophobias</i> | | |
- a. Syphilophobia
 - b. Parasitophobia
 - c. Cancerophobia ("burning tongue," etc.)
 - d. Bromidrosiphobia
 - e. Rupophobia
 - f. Peladophobia

Group II

SKIN DISORDERS FREQUENTLY DUE TO PSYCHIC DISTURBANCES (ALTHOUGH NOT EXCLUSIVELY)

1. *Urticaria*
2. *Angioneurotic Edema* (also in group V)
3. *Erythema* (may later lead to rosacea)
4. *Pallor* (sudden)
5. *Horripilation*
6. *Cutis Anserina* (goose-flesh)
7. *Pruritus* (cutaneous; ani; vulvae)
8. *Tattoo Marks* (disputed)
9. *Changes in Sweat Secretion* (hyperhidrosis;
hypohidrosis)
10. *Paresthesias* (hyperesthesia; anesthesia)
11. *Pemphigus Hystericus*
12. *Alopecia Areata* (also in group V)
13. *Lichen Planus*
14. *Certain Eczemas, such as those due to Allergy* (also
in group V)
15. *Dermatitis Herpetiformis*
16. *Psoriasis*
17. *Dermatitis Dysmenorrhoeica* (also in group III)

Note: Items 11, 12, 13, 14, 15, 16, 17 disputed by
most observers.

5. *Trophic Disturbances due to Multiple Sclerosis*
6. " " " " *Tumors of the Central or Peripheral Nervous System*
7. " " " " *Traumatism of the Central or Peripheral Nervous System*
8. " " " " *Epidemic Encephalitis*
9. *Trophic Ulcers due to Arteriosclerosis of Blood Vessels of Spinal Cord*
10. *Leprosy* (also in group V)
11. *Von Recklinghausen's Disease* (also in group III)
12. *Pemphigus* (disputed)
13. *Pellagra* (disputed) (also in group III)
14. *Herpes Simplex* (disputed) (also in group III)

(NOTE:)—When skin breaks down (trophic disorder) in the presence of a mental disease, it is evident that the mental disease is due to an organic disturbance.

Group V

SKIN DISORDERS OFTEN ATTRIBUTED TO DISTURBANCES OF THE VEGETATIVE NERVOUS SYSTEM (ANGIONEUROSES AND TROPHONEUROSES)

1. *Angioneurotic Edema* (also in group II)
2. *Scleroderma*
3. *Raynaud's Disease*
4. *Erythromelalgia* (also in group III)
5. *Progressive Facial Hemiatrophy*
6. *Certain Eczemas, particularly of the Allergic Type*
(also in group II)
7. *Alopecia Areata* (also in group II)
8. *Trophic Disorders of the Skin found in:*
 - a. *Syringomyelia*
 - b. *Multiple sclerosis*
 - c. *Myelitis* (complete and incomplete)
 - d. *Tumors of the central or peripheral nervous system*
 - e. *Traumatism of central or peripheral nervous system*

- f. Epidemic encephalitis
- g. Arteriosclerosis of the blood vessels of the spinal cord
- h. Leprosy (also in group IV)

While there is concurrence of opinion in regard to the interrelation of the psychic conditions and skin disturbances generally, many divergent views are held by observers concerning various specific disorders.

The etiologic factor in a number of skin diseases is still unrecognized. Their occurrence coincident with psychogenic disorders, however, is frequently noted. Although it is impossible to show, by any palpable means, a direct connection between neurogenic, psychogenic and dermatological conditions, it is likely that a study of their joint occurrence, with a view to their possible causal relation, may help in solving many a perplexing problem.

Influenced by many of the outstanding articles in the literature, and as a result of personal observation and experience, the writer has divided these conditions into five groups, according to the plan given above. They will now be discussed under these headings:

Group I

SKIN DISORDERS DUE EXCLUSIVELY TO PSYCHIC DISTURBANCES

The fact is recognized that blood-vessel tonus is regulated by several factors, among which may be included the psychic element, the vagotonic and sympathetic nervous systems. These, in turn may be influenced by the internal secretions. This vascular influence, of course, is exerted in the skin as well as in all other organs of the body. It therefore seems logical to suppose that every skin disease which results from a functional or organic disturbance of the central or peripheral nervous system develops through the action of the vegetative nervous system. Viewed in this way, it seems quite impossible to disassociate these various branches of the organism.

The conditions under discussion in Group I comprise

disorders of the skin due exclusively to psychogenic or neurogenic conditions. Included in this group are:

a. Dermatitis factitia (mythomania of Dupré).

b. The Compulsion Neuroses. These include (1) dermatothlasia (neurotic excoriation); (2) trichotillomania; and (3) trichokryptomania.

c. Dermatophobias, namely: (1) syphilophobia; (2) parasitophobia; (3) cancerophobia ("burning tongue", etc.); (4) bromidrosiphobia; (5) rupophobia; and (6) peladophobia.

A great proportion of the functional neuroses predispose to various skin affections. It is these disorders which comprise Group I.

The term *dermatitis factitia* (also called feigned eruptions) includes numerous conditions in which the varying degrees of skin disorders range from a simple erythema to "neurotic" gangrene. Dupré classifies the "feigned eruptions" among the mythomanias. *The patients always practice deception.* In these patients various methods may be used in order to produce lesions, among the most frequent being the application of chemicals, such as carbolic acid. As a rule, the artificial dermatitis can be recognized in spite of the patient's deceptive history; but at times, even the well-trained dermatologist may be misled. Many cases are cited in the European literature where amputation of one or more limbs has been performed on patients presenting large areas of gangrene of "idiopathic" origin, which cases later were proven to be due to application of caustics by the patient.

Neurotic excoriations (dermatothlasia) are lesions in the skin produced by the patient, *in which no deception is intended*, and in which he or she has an uncontrollable desire to pick, scratch or to injure the skin in other ways. Very often the patient imagines that parasites are in the skin and that he must pick them out.

Concerning the neurotic excoriations Klauder⁶ states:

"Under this name, Fournier⁷ first described a morbid state characterized by an uncontrollable desire of the

patient to scratch or rub one or more areas of the skin. This practice may give rise to excoriated lesions. Fournier thought perhaps it was an atavistic expression comparable to the scratching of certain animals and birds and comparable also to the self-mutilation of certain psychopathic patients . . ."

"In the same category as dermatothlasia may be placed self-inflicted lesions of the skin grouped under the heading neurotic excoriations. These have been described under different names by a number of writers, notably so by Adamson,⁸ MacKee,⁹ and Pusey and Senear.¹⁰ Brocq's excoriated acne of young girls is also placed in this group. The involved area is usually at first pruritic and may have been the site of some insignificant skin lesion. As a result of what is apparently an uncontrollable desire to pick or dig with the finger nail or some other agent, oval or irregularly shaped excoriations or ulcers are produced. Pigmented areas and scars, the result of involution of former lesions, may also be seen. In the excoriated acne of young girls, manipulation is directed at the existing acne lesions involving the face.

"Neurotic excoriations are distinct from a factitious dermatitis. Self-inflicted lesions of the skin, produced for the purpose of deception, are seen in certain hysterical young women, the psychogenesis of which is to arouse sympathy, and also in malingerers. In the condition under discussion there is a clear recognition by the patient of the unreasonable nature of the act. In view of this and since it manifests a defective self-control, it constitutes a psychasthenia, other evidences of which may be manifested.

"Neurotic excoriations exist in a variable degree of severity. The milder cases are, of course, more amenable to treatment with psychotherapy which is directed at the psychic fixation by distraction and voluntary reeducation, or more properly, by autoreducation. Treatment, however, in a large measure, depends on the nature of the psychogenesis. Self-inflicted lesions of the skin, grouped as neurotic excoriations, have a variable psychogenesis.

Some, perhaps, are an expression of a tic, others an expression of a phobia. Still others may be among the topalgias of Brocq, or among Janet's *l'obsession de la honte du corps*. In the latter cases, manipulation is performed as a result of the anxiety of the patient to effect a disappearance of the lesion, which occasions in the patient's mind an obsession of shame. This particularly applied to cases of excoriated acne in young girls."

Trichotillomania (the plucking out of hair) and *trichokryptomania* or *trichorrhexomania* (the habit of breaking the hair against the finger-nail) may be considered along with the neurotic excoriations as being a compulsion neurosis in which the patient does not intend to practice deception and gives a history of having an uncontrollable desire to produce the conditions just described. A condition of this type may be lead to atypical, patch-like alopecias which may cause much confusion in diagnosis. Oftentimes these hairs are swallowed, subsequently leading to occlusion of the intestine; 108 cases of this type have been reported by Davis.¹¹ Those subject to *trichotillomania* usually pull out the hair without being conscious of the act, similarly as in biting the nails. Some patients state that the pulling out of the hair is caused by itching of the scalp; in others a plausible cause is missing. On the whole, it is found in hysterical individuals and, according to Strandberg, was observed by him in two children, as young as two and eight years of age respectively. Another interesting finding consisted in the discovery that frequently one or several persons in the families of those addicted to trichotillomania were known to suffer from psychic inferiority, psychosis, struma and mania. *Trichokryptomania* is evidently less frequently recognized than trichotillomania, little attention having been given to the former in the literature.

On the other hand, the *dermatophobias* seem to be discussed at greater length by the various investigators. All types of phobia are encountered in medical practice, producing symptoms in various organs, such as "nervous indigestion," diarrhea, nervous headache, etc. Is it there-

fore not logical to believe that the skin may likewise share with the other organs a certain quota of derangement?

It is known that the feeling of itching may decrease or disappear by suggestion. Again, almost every dermatologist has been consulted by patients who believed they were not freed from itching after a course of treatment which was considered thorough by the physician. This and similar forms of phobia are frequently so pronounced as to lead to a serious abnormal state of mind. Among the dermatophobias which have demanded sufficient notice to warrant a definite nomenclature are the following: *syphilophobia*, *parasitophobia*, *cancerophobia* (which includes the condition known as "burning tongue"), *bromidrosiphobia*, *rupophobia*, *pseudophobia*, etc. The distinguishing feature of each phobia is easily suggested by each type, a further discussion of the subject being limited because of the lack of time allotted.

It seems evident from the foregoing that a better understanding of the interrelation or interdependence of psychic disorders and of disturbances of the skin is necessary; and it is apparent that there is an urgent need for improved methods in the study of the innervation of the sympathetic and its pathology, as well as its relation to the internal secretions.

It is vastly important that the dermatologist recognize the psychogenic origin in dermatoses, for many of these conditions hardly come within the realm of dermatology. Such a patient should be treated in collaboration with a neurologist.

A description of the remaining groups, also additional bibliography, will appear in the completely published paper.

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PSYCHOGENIC HEART DISEASE

JOHN WYCKOFF

Cardiac psychoneuroses may be classified as:

1. Fatigue neurosis (Neurasthenia).
2. Introspective neurosis (Hypochondria).
3. Anxiety neurosis.
4. Substitution neurosis (Hysteria).
5. Obsession neurosis (Psychasthenia).

Of these, the fatigue and introspective neuroses are extremely common. Substitution neurosis is less common, and anxiety and obsession neuroses rarely cause cardiac symptoms. Fatigue neuroses which were extremely common in the war are also seen in civil life. These patients exhibit two characteristics.

First, a history of marked nervous instability, either in the patient's family or in the past history of the patient himself, such as nervous prostration or neuroses referred to other organs than the heart. It is frequent to get histories of one or more abdominal or gynecological operations performed for the relief of long standing subjective symptom or symptoms.

Second, there is the history of an exciting cause in the patient's environment. This may be physical or mental effort, business and financial worries, family infelicities or seemingly trivial difficulties.

The unstable nervous system and the exciting cause are both always present, but in an inverse relationship; the more stable the nervous system the greater will have to be the exciting cause to bring about symptoms, and the more unstable the nervous system, the less need of an exceptional environmental trauma to produce them.

In civil life, usually only the more unstable develop this type of neurosis, though symptoms appear among individuals who appear normal, at times of marked business depression, after disasters, or after great sorrow.

The symptoms are fatigue, palpitation, precordial pain and a sensation of breathlessness. Usually these symptoms are increased by effort, and not unusually do the patients have attacks of dizziness and syncope. On examination they are seen to look worried and nervous, they talk a great deal of their symptoms, but not as much as do the introspective neurotics, their hands tremble and frequently their skin shows signs of vasomotor instability. The heart is rarely enlarged, the rate usually 100 or over, sinus arrhythmia is the rule but ventricular premature contractions and paroxysmal tachycardia are not uncommon. Short systolic murmur may be present. Roentgenographic and electrocardiographic examinations are usually negative.

Many of these symptoms come from a lowering of the threshold to normal physiological processes. Often these patients have palpitation with regular hearts, not too rapid, and with normal blood pressure. Often they feel short of breath with normal respiratory rates. At other times, they have tachycardia and rapid, but usually shallow respiration.

Introspective Neuroses. Among the cardiac neuroses occurring in civil life, this is the largest group. These are patients who present some subjective or objective symptoms of heart disease, usually from an extracardiac cause, and who dwell upon the symptoms or symptom, worrying about them, collecting reports of various examinations made by different heart specialists, comparing them, worrying about the fact that the authorities differ,

consult others, and talk continuously to every one about their symptoms. Exaggerated cases of this sort own their own stethoscope, keep charts of ventricular and pulse rates, make long notes of trifling symptoms which they read to suffering physicians at great length.

The symptoms which usually first call the attention of such introspective patients to their heart is usually one of the common irregularities in rhythm. A marked sinus arrhythmia, premature contractions, or an attack of paroxysmal tachycardia will start such a patient; then if he consults one of the brethren who thinks all irregularities equally serious and who tells him he has organic disease of the heart, usually after only a casual examination, he is well on his way to a life of worry. The condition of at least some of these patients is due to improper interpretation of symptoms and signs by physicians.

Even after the symptoms which may have excited this type of neurosis have disappeared for years, the patient will go on asserting and believing that he has heart disease.

Occasionally as patients grow older, they actually live long enough to develop arteriosclerotic heart disease, and then there is great danger of missing the early signs of organic disease because the patient is still believed to have a neurosis. Once at least, I made such a mistake.

This type of neurosis sometimes develops in a patient with mild organic heart disease, and makes a difficult complication. Such a patient without an objective sign of heart failure, with only slightly diminished, or no diminution of cardiac reserve, but with signs of slight organic heart disease, will spend years as an invalid because of the development of a fixed idea of the gravity of his or her condition.

Patients with anxiety neurosis may have cardiac symptoms—the most usual symptom is palpitation. As White says: "These patients rarely present a problem to the internist, as the cardiac symptoms are so overshadowed by the state of tension, sleeplessness, illogical worries and inability to concentrate."

On the other hand, patients suffering from the substitution type of neuroses may develop attacks of heart pain which are very difficult to differentiate from pain in severe organic disease of the heart. Certain attacks of so-called "pseudo-angina" come to individuals as typical hysterical manifestations, and the differentiation may be difficult if the patient is first seen in the first or second attack, but usually is not difficult if the physician knows the patient and follows the course of the illness.

Obsession neuroses rarely manifest themselves by cardiac symptoms.

In the foregoing discussion, reference to etiology other than fatigue as a cause of these neuroses has been avoided. At least there must be reason for belief that there is a relationship between their cause and the endocrines when one goes over the rather remarkable glandular therapy which one finds the patients have received. Usually such therapeutic proceedings have been without control and the results obtained, if viewed objectively and with due consideration to the laws of probability, far from convincing. It has seemed to me the best results therapeutically are obtained in the following way. Accept the patient's symptoms as facts, examine him with care and thoughtfulness. Explain to him that no signs of structural disease are present, though all known methods of exploration have been used. Explain that normal physiological function may creep over the threshold of consciousness and give rise to symptoms. Explain how this threshold is best kept high. Describe the likelihood of relapse and when such relapses are apt to occur. If possible get rest, mental and physical, for the fatigue cases and be sure that it is rest that the patient is getting and not some other thing which some member of the family, or solicitous friend, thinks may do him good. Get suitable mental and physical occupation for the introspective group. Build up the general health of the patient and keep it at as high a level as possible. Avoid placebos, but treat him honestly and as an intelligent being. When needed, give simple sedatives. Under such a common sense regime many improve and live useful lives.

NEUROGENIC DISORDERS OF THE HEART

ERNST P. BOAS

The heart rate and rhythm depend on variations in the degree of excitation of its two sets of nerves. These variations are determined by reflexes passing over innumerable afferent pathways. This regulation of the activity of the heart is an adaptive mechanism enabling the heart to meet the demands placed on it by the varying activities of the body. Loss of this regulatory function may have serious consequences. Complete denervation of the heart, that is, severance of all of the extrinsic cardiac nerves, greatly restricts the activities of an animal. In dogs who have survived this operation for many months, the circulation is adequate when they are at rest, but any greater physical exertion is impossible. The animals collapse from exhaustion and there is no acceleration of the heart. The characteristic reactions to atropine and epinephrine are also lacking, and thyroid feeding brings about no tachycardia.

The afferent arcs of the cardiac reflexes may arise in almost any part of the body. They may come from the heart itself, from the lungs and other viscera, they may pass thru the segmental parts of the nervous system, *i.e.*, the cranial nerves, or the spinal nerves. Afferent impulses may also reach the vagus and sympathetic nuclei from all suprasegmental parts of the brain. One need but recall the changes in heart rate accompanying emotions and varying psychic states. No convincing proof has been offered of the existence of cardiac reflex arcs to the hypothalamus, and I believe with Francois-Franck and with Tigerstedt that the vital cardiac reflex arc passes thru the medulla and that the brain acts as a peripheral organ initiating reflexes via the medulla.

The following classification of neurogenic disorders of the heart may be attempted. Its value lies chiefly in its demonstration of the limitations of our knowledge.

A. I. Disorders of the nervous structures in the end organs

1. Vagus
2. Sympathetic

II. Disorders of the ganglionic arc

1. Vagus
2. Sympathetic

III. Disorders of the segmental arc

1. Vagus
 - a. Nerve trunk
 - b. Dorsal nucleus
2. Sympathetic

IV. Disorders of the hypothalamic arc

1. Vagus
2. Sympathetic

B. Disorders due to excessive or exaggerated afferent stimuli

1. Segmental
 - a. Somatic
 - b. Visceral
2. Suprasegmental

Cerebral (Abnormal mental states)

C. Disorders due to increased irritability of the visceral nervous system of unknown localization.

1. Constitutional
2. Acquired
 - a. Infectious
 - b. Internal secretory

D. Disorders secondary to neurogenic vasomotor disorders.

I know of no cardiac disturbances that may be placed in group one, two or four. Group three, disorders of the segmental arc, is represented in medical periodical literature by innumerable inconclusive case reports. There is hardly one which will stand critical analysis. Among

the conditions which were supposed to lead to vagus tachycardia were compression of the vagus by mediastinal tumors, tuberculous lymph nodes, aortic aneurysms, alcoholic neuritis of the vagus, and destruction of the dorsal vagus nucleus in bulbar palsy. Yet in practically every case there existed in addition to the nerve lesion other potent causes of tachycardia such as fever, dyspnea, toxemia or anxiety. On the other hand, neurogenous forms of Stokes-Adams syndrome have been described.

It is apparent that focal lesions of the extrinsic nervous apparatus of the heart play no significant role in the genesis of cardiac disorders. Neurogenic circulatory disturbances fall chiefly within the last three categories of our classification. The first group comprises cardiac disorders due to excessive or exaggerated afferent stimuli. Here may be grouped the simple tachycardias and occasional bradycardias associated with disease of the gall bladder, stomach, and other internal organs. Of greater import, however, are the occasional cardiac irregularities that are initiated by reflex stimuli from diseased viscera.

Of equal importance are cardiac disorders due to increased irritability of the visceral nervous system. It is often impossible to determine to what extent the cardiac disorder is due simply to increased irritability of the extrinsic nervous apparatus of the heart, and to what degree it is secondary to neurogenic vasomotor disorders, or to an increase of afferent stimuli from the brain, for, as a rule, all three factors operate together.

As a result of the disturbed innervation of the blood vessels, the capillaries and venules in the splanchnic region and in other areas of the body are dilated and a large amount of blood becomes pooled in them. Consequently, there often is an inadequate amount of blood in the left ventricle and in the arterial tree. This lack makes itself felt particularly during and after exercise and undoubtedly contributes largely to the rapid pulse, the dyspnea and sense of exhaustion which follows physical exertion.

NEUROGENIC AND PSYCHOGENIC DISORDERS OF THE ALIMENTARY CANAL

JOHN L. KANTOR

The paper dealt with anatomical and physiological considerations, general and local disorders of the nervous mechanism and presented the following conclusions:

From the view-point of the practising gastro-enterologist, a survey such as this, of the current literature on neurogenic and psychogenic disorders of digestion, yields the following impressions:

1. An increasing number of cases formerly diagnosed as "nervous dyspepsia" are shown on study by improved methods to be instances of actual organic disease of the digestive organs or of their nervous communications.

2. The autopsy findings of post-inflammatory nerve lesions in cases of digestive disorders suggests the advisability of careful scrutiny of dyspeptic patients for evidence of past infections (such as tuberculosis) which might involve important nervous pathways in scars or adhesions.

3. The theory of autonomic inbalance occupies a prominent place in discussions of the etiology of such important digestive disorders as peptic ulcer, cardiospasm, intussusception, and congenital pyloric stenosis.

4. In some digestive conditions (intestinal tuberculosis, some cases of peritonitis), it is the secondary nerve changes and not the primary lesions which produce the "characteristic" symptomatology.

5. The concept of "solar syndromes," with or without actual lesions in the nerve plexuses, is advanced by some writers to explain the painful phenomena in a rather diverse group of abdominal conditions.

6. Lesions of the spinal cord may produce visceral effects either directly by involving the preganglionic fibers at their point of origin, or else indirectly by affecting the

suprasegmental neurons connecting with these preganglionic fibers. The general result of destroying the superior connections is a release of the lower neuron reflexes.

7. Neural ileus is an important condition often leading to useless surgical exploration. This form of ileus may be due to lesions either in the segmental or suprasegmental arcs or to psychoses with marked depression. It is a common symptom of transverse myelitis.

8. Important centers regulating the functions of the entire involuntary nervous system are now known to be located in the diencephalon. Lesions in this region occur frequently in epidemic encephalitis, and occasionally in dementia paralytica and dementia praecox.

9. Psychic disorders of digestion are mediated through the emotions and through ideas causing conditioned reflexes. Conditioned reflexes, therefore, furnish a basis for the development of digestive habits, peculiarities and perversions.

10. The psychoneuroses are not uncommonly encountered by gastro-enterologists because the digestive symptoms are so prominent and varied. In melancholia, constipation is a particularly constant and stubborn manifestation.

Section of Medicine, February 21, 1928

THE CARDIOTACHOMETER

AN INSTRUMENT TO COUNT THE TOTALITY OF HEART BEATS OVER LONG PERIODS OF TIME

ERNST P. BOAS

An instrument, named the cardi tachometer, has been devised, by means of which the total number of heart beats may be counted over long periods of time while the subject under test is actively moving about. The action current of the heart is led off through two chest electrodes, green soap serving as an electrolyte, into a specially constructed

amplifier. Leaving the amplifier, the current actuates a sensitive relay which, in turn, operates an electromagnetic counter, and simultaneously records on a moving tape.

We have repeatedly kept patients under test for from twenty to twenty-four hours, during successive periods of rest, activity and sleep. We have not yet had time to accumulate enough data to draw final conclusions on any of the phenomena that we have studied, but have made some preliminary observations that seem to be of real interest. We have run patients for long periods of time with a view of learning the range of variability of the heart rate and, in particular, its behavior during sleep.

The normal individual exhibits only a moderate variability in heart rate in response to his ordinary daily routine. During sleep the rate is from 10 to 20 beats a minute lower than when the subject is at rest, but awake. There are many people with an unduly rapid and variable heart rate. Relatively slight physical exertion or emotional excitement is followed by an unusual acceleration of the heart, so that throughout the day, particularly whenever the subject is examined, the pulse rate is rapid. During sleep, however, all of these reactions are abolished and low figures are obtained. Apparently the rate does not sink to the same low level as it does in the more phlegmatic type of person, a fact which suggests that even during sleep the vegetative nervous system of these individuals is more irritable than normal.

On the other hand, subjects of a rheumatic myocarditis with rapid heart rates show very little drop in rate during sleep. This is a valuable sign for diagnosis, and indicates that the rapid heart rate is not determined primarily by factors extrinsic to the heart. Similar observations have been made in patients with Graves' disease, as well as in those suffering from congestive heart failure.

Studies of patients with auricular fibrillation have been most interesting. In spite of the fact that in them the sino-auricular node no longer controls the heart rate, variations in heart rate far greater than in normal persons has

been found. It is well known that exercise, the administration of atropine, or, at times, an intercurrent infection, will greatly increase the ventricular rate in subjects with auricular fibrillation, and that under rest in bed the rate may become reduced. We have been able to confirm the increase in ventricular rate accompanying exertion, and have been able to demonstrate a great variation in ventricular rate during the day. Most interesting of all is the fact that in undigitalized, as well as in digitalized patients, the ventricular rate during sleep may drop 25 to 35 beats.

The possible clinical applications of the cardiometer are manifold. Many physiological problems, such as the response of the heart to exercise, drugs, and other stimuli can be studied. Its response during exercise can be accurately measured. As an accessory in many physiological and clinical examinations, such as basal metabolic rate and minute volume flow determinations, it is invaluable. It will for the first time give us an actual count of the total number of heart beats under the conditions and activities of every day life. It will be of particular value in determining the clinical significance of the simple tachycardias.

ANNUAL GRADUATE FORTNIGHT

The Academy is making arrangements for a series of lectures at the Academy, co-ordinated clinics, clinical demonstrations and courses in hospitals and teaching institutions of New York, on the subject of "The Problem of Aging and of Old Age."

This is to be the first "Annual Graduate Fortnight" which the Academy is arranging for the benefit of general practitioners and specialists, which will take place the first two weeks of October, beginning October 1, 1928.

It is planned to have each year a subject chosen for the Annual Fortnight which is of outstanding importance in the practice of medicine and surgery and which will be approached from every available angle with the least loss of time and the greatest possible opportunity to be offered to physicians from out of town.

A number of outstanding authorities will be invited to take part in the Annual Fortnight, and particular emphasis will be placed upon lectures and courses on the early recognition and prevention of disturbances, commonly ascribed to aging, but very often not the result of aging but its cause. Courses on functional tests of organs and systems of function such as circulation, digestion, metabolism, endocrine functions, immunity, etc., are to be offered and the relation of unrecognized forms of intoxication, chemical as well as bacteriological, to the dangers of middle age are to be specially emphasized.

TESTIMONIAL DINNER TO DR. NORRIS

On Monday evening, February 6th, 1928, the Committee on Public Health Relations and that on Medical Education gave a dinner at the Academy of Medicine in honor of Dr. Charles Norris, Chief Medical Examiner of the City of New York. The dinner was tendered to Dr. Norris as an expression of the esteem in which he is held by medical men of the community and by way of recognition of his remarkable achievements in the ten years during which he has held office. Sixty men, members of the two committees and several distinguished guests, attended the dinner, joining enthusiastically and of one accord in the eulogy of Dr. Norris.

Dr. Samuel W. Lambert, President of the Academy, acted as toastmaster. In his address of welcome Dr. Lambert briefly outlined Dr. Norris' career from his early training under Dr. T. Mitchell Prudden to the present, and started the testimonials of the evening by calling on Dr. James Ewing to tell more in detail about the early part of Dr. Norris' career.

Dr. Ewing congratulated Dr. Norris on the splendid gathering in his honor, paying tribute to the distinguished character of the group present. Dr. Ewing spoke also of Dr. Norris' pioneer work in sero-bacteriology, his connection with Cornell University Medical College, his appointment as pathologist at Bellevue Hospital, and his unusual foresight in the development of this department, an outstanding accomplishment in its day and at the time the best equipped pathological laboratory of any hospital in the country. Under Dr. Norris the work at Bellevue Hospital laboratory developed steadily, and Dr. Norris became not only technical pathologist but consultant pathologist, contributing his knowledge and advice to the Clinical Department and to the Superintendent of the hospital.

With the change from the old inefficient and incompetent pretence to legal medicine in the form of the coroner to the saner system of a unified Department of Medical Examiner, in the bringing about of which the Academy

of Medicine, through its Committee on Public Health Relations, had an important part, another opportunity came to Dr. Norris. Dr. Ewing said that this was really an event in the history of New York Medicine. In closing his remarks the speaker emphasized the importance of this branch of medicine, and of the contributions made by Dr. Norris in the course of his career in it.

Judge Joseph E. Corrigan, who presides over the Homicide Court, spoke eloquently about the work of Dr. Norris, pointing out the great improvement of the new system over the old.

The system of medical examiner was begun in Massachusetts as a State institution and became particularly developed in Boston. Dr. George Burgess Magrath, Medical Examiner of Boston, was called upon to tell of the work in that city. Dr. Magrath described the development of the system and its present status. He told of Dr. Norris' inspection of the Massachusetts system seven or eight years after its inception, praised the organization which Dr. Norris has instituted and in conclusion saluted him as "a skilled, sagacious man of science, wise administrator, honest public servant."

Another representative of the courts, Justice Philip J. McCook of the Supreme Court, was called upon by Dr. Lambert. Judge McCook spoke of the splendid work of Dr. Norris in connection with medical jurisprudence in its various phases and like Judge Corrigan commended particularly the ability of Dr. Norris to give satisfactory, impartial and competent testimony in court.

Dr. Ludwig Hektoen described briefly the historical development of forensic medicine and discussed various phases of it, including the requirements for medico-legal institutions or institutions for forensic medicine which already exist in certain European countries, but not in America. Dr. Hektoen expressed the opinion that since New York has successfully taken the first step to modernize its medico-legal work, it will eventually take the step of providing adequate training in it.

Dr. Norris said that he knew very well that his work could be improved in many ways and called attention to the needs of his service. With over 2,000 autopsies a year and the limited staff and equipment it is scarcely possible to handle the work in an accurate and scientific manner. The stenographic force is limited and the laboratory staff likewise insufficient. It is necessary to supplement the staff and salaries from private sources. Dr. Norris reiterated what Dr. Magrath and Dr. Hektoen had said about the need for training people for the service.

Dr. MacCallum expressed the opinion that there is a need for such an institute, that it should be very elaborately planned and staffed, that it should be established in relation to several universities and should be connected with the department now headed by Dr. Norris.

Dr. Dana suggested that the group present should take some action in this matter. Motion was made to appoint a committee to study the project and to report on it. The motion was seconded and carried.

The testimonials to Dr. Norris were concluded with the remarks of Dr. MacNeal who has recently conducted a survey of the Medical Examiner's service in New York City.

PUBLIC HEALTH RELATIONS COMMITTEE
SUMMARY OF ACTIVITIES

OF THE
EXECUTIVE COMMITTEE

MONTH OF FEBRUARY
1928

Among the matters which came before the Public Health Relations Committee were the following:

1. *The Proposed Dwelling Law*

After considerable study, the State Commission, consisting of members of the State Senate, the Assembly, and representative private citizens drafted a comprehensive bill modifying the existing laws on housing.

The phases of this bill which were of particular interest to the Committee were the provisions for light, air and general sanitation, which the bill makes possible in dwellings to be erected in the future.

The following resolution was adopted by the Executive Committee and endorsed by the Council of the Academy:

"The dwelling conditions in a large city are a very direct concern of all who are interested in the preservation and promotion of public health.

The factors of light, air, overcrowding and cleanliness in dwelling houses materially affect the health and efficiency of the members of any community. This is particularly true in large cities where other interests of importance may tend to run counter to that of health.

The Committee on Public Health Relations of the New York Academy of Medicine is, therefore, deeply interested in the proposed Dwelling Law in so far as it promises to bring about an improvement in the sanitary living conditions of New York City.

It is the opinion of this Committee that the proposed law does represent an attempt to take an important step

forward toward such improvement. Upon the economic effects of the proposed law relative to such matters as rentals, and land values, construction costs and the like, and also upon the practicability of such a measure we can have no opinion.

We do believe, however, that factors of health have sufficient importance to outweigh many possible economic objections.

Insofar, therefore, that the proposed law does provide for more healthy and sanitary living conditions and within the limitations above outlined, this Committee heartily endorses such provisions."

2. *Medico-Legal Work of the City*

On February 6, 1928, a dinner was given in honor of Dr. Norris at the Academy under the joint auspices of this Committee and that of the Committee on Medical Education. There were sixty-five persons present and the speakers, which comprised medical men of distinction as well as judges most familiar with the work of the Chief Medical Examiner of this city, emphasized the services rendered to the city by Dr. Norris and stressed the desirability of creating, in conjunction with his office and the universities, an institute for the teaching of legal medicine. At the present time, there is no adequate teaching offered in this important branch.

It was also pointed out that more adequate appropriation should be forthcoming from the city to make possible a larger and better paid laboratory staff.

Other matters which were considered by the Committee were:

- a. Ventilation of school buildings;
- b. Standardization of Civil Service requirements in relation to medical positions in the city service;
- c. Poliomyelitis convalescent serum;
- d. The need of study of helio- and photo-therapy;
- e. Problems of street cleaning, and
- f. The present organization of the Tuberculosis Admission Bureau.

PROCEEDINGS OF ACADEMY MEETINGS JANUARY

STATED MEETINGS

Thursday Evening, January 5, at 8:30 o'clock

I. EXECUTIVE SESSION

Business of the Annual Meeting

Action on amendment to the By-laws, introduced at the Stated Meeting of December 1, 1927

Election of Fellows

II. ADDRESS

On the significance of bacterial allergy in infectious diseases, Hans Zinsser, Professor of Bacteriology and Immunology, Harvard University

III. PAPER

The relation of lobar pneumonia to massive atelectasis of the lung, Pol. N. Coryllos (by invitation), and George Birnbaum (by invitation)

Thursday Evening, January 19, at 8:30 o'clock

I. EXECUTIVE SESSION

II. SYMPOSIUM: GRADUATE MEDICAL EDUCATION

a. An experience in university graduate medical education, Louis B. Wilson, Director, Mayo Foundation (by invitation)

b. On the future of graduate medical education, Ludwig Kast

c. Graduate medical education and the practitioner, John E. Jennings

SECTION MEETINGS

SECTION OF DERMATOLOGY AND SYPHILIS

Tuesday Evening, January 3, at 8:30 o'clock

ORDER

I. PRESENTATION OF PATIENTS

a. Cases from Bellevue Hospital, Mihran B. Parounagian

b. Cases from Gouverneur Hospital, Josiah P. Thornley

c. Miscellaneous cases

II. DISCUSSION

III. EXECUTIVE SESSION

Note: Examination of cases is limited to members and their invited guests

SECTION OF SURGERY

Friday Evening, January 6, at 8:30 o'clock

ORDER

I. READING OF THE MINUTES

II. PRESENTATION OF CASES

a. Rectal intussusception complicating a malignant adenoma in intestinal polyposis, J. Gottesman

- b. 1. A case of pneumo-peritoneum of unexplained origin
- 2. A case of diverticulosis of the large intestine, Russell H. Patterson
- c. Carcinoma of the rectum—combined operation—immediate sacral vorlagerung, John C. A. Gerster
- d. Two cases demonstrating the modified Miles operation for carcinoma of the lower sigmoid and rectum, Thomas H. Russell
- e. Ball-valve colostomy, 2½ years after operation in case of adenocarcinoma of rectum, George A. Wyeth

III. PAPER OF THE EVENING

The operative treatment of cancer of the rectum, Daniel J. Jones, Boston (by invitation)

IV. Discussion opened by Drs. Dowd, Mathews, Pool and Yeomans

SECTION OF NEUROLOGY AND PSYCHIATRY

The Section of Neurology and Psychiatry will hold a combined meeting with the Section of Obstetrics and Gynecology on Tuesday, January 24.

The program for the meeting will be announced in the second January folder.

SECTION OF PEDIATRICS

(HOSACK HALL)

Thursday Evening, January 12, at 8:30 o'clock

ORDER

I. PAPER OF THE EVENING

Endocrine glands in relation to infancy and childhood, Lewellys F. Barker, Baltimore (by invitation)

Discussion, George Draper, Charles R. Stockard, Frederick Tilney

SECTION OF OTOTOLOGY

Friday Evening, January 13, at 8:30 o'clock

ORDER

I. READING OF THE MINUTES

II. PAPERS OF THE EVENING

a. Anatomy of the lateral sinus and pathology of its infections, James Garfield Dwyer

b. Diagnosis and treatment of infections of the lateral sinus, George Loring Tobey, Jr., Boston (by invitation)

Discussion by William H. Haskin, John McCoy, John R. Page, T. Laurance Saunders

III. GENERAL DISCUSSION

IV. EXECUTIVE SESSION

SECTION OF OPHTHALMOLOGY

Monday Evening, January 16, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. PRESENTATION OF CASES
 - a. Glioma of optic nerve, report of a case, Herbert W. Wootton
 - b. Chorioretinae depigmentation accompanying generalized vitiligo, report of a case, David Wexler (by invitation)
 - c. A case of trichinosis with exophthalmos, Ben Witt Key
- III. PAPERS OF THE EVENING
 - a. A modified Mott's operation for ptosis, Daniel B. Kirby
 - b. Observations of the eye clinic of Dr. Henry T. Holland, at Shikarpur, India, with lantern slides and motion pictures, James Wilson Cassell
 - c. Fundus as a definite index to arterial disease, with analysis of 100 cases, Sigmund A. AgatstonDiscussion by Harlow Brooks, Eli Moschowitz, Ernst Boas
- IV. EXECUTIVE SESSION

SECTION OF MEDICINE

Tuesday Evening, January 17, at 8:30 o'clock

Joint Meeting with the American Dietetic Association

ORDER

- I. PAPER OF THE EVENING
The control of protein in the diet, Eugene F. DuBois
- II. DISCUSSION
Mary Swartz Rose (by invitation), Grace MacLeod (by invitation), Nellis B. Foster

SECTION OF GENITO-URINARY SURGERY

Wednesday Evening, January 18, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. PRESENTATION OF CASES
 - a. Cyst of the prostatic utricle, Samuel Lubash (by invitation)
 - b. Supravescical hematuria due to renal infarction, Paul W. Aschner
 - c. Bacillus coli infection of urinary system. X-ray studies, V. C. Pedersen
- III. PAPERS OF THE EVENING
 - a. My personal experiences with tumors of the bladder, Arthur L. Chute, Boston (by invitation)
 - b. A new procedure in the roentgen ray diagnosis of ureteral calculi, Ralph L. Dourmashkin
- IV. GENERAL DISCUSSION
- V. EXECUTIVE SESSION

SECTION OF ORTHOPEDIC SURGERY

Friday Evening, January 20, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. PAPERS OF THE EVENING
 - a. Derotation, detorsion and stabilization of the fifth lumbar vertebra in scoliosis, Paul B. Steele, Pittsburgh (by invitation)
 - b. Some observations in an end result study, now being made of 348 cases of scoliosis treated at the New York Orthopedic Hospital by fusion, J. C. Risser (by invitation)
- III. DISCUSSION OPENED BY Russell A. Hibbs
- IV. GENERAL DISCUSSION

SECTION OF HISTORICAL AND CULTURAL MEDICINE

Friday Evening, January 20, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. PAPERS OF THE EVENING
 - a. The life and work of George S. Huntington, Prof. Charles F. W. McClure, Princeton University (by invitation)
Discussion opened by Frederick Tilney, Samuel W. Lambert
 - b. The doctor looks at culture, Joseph Collins

Combined Meeting

SECTIONS OF NEUROLOGY AND PSYCHIATRY, AND OBSTETRICS AND GYNECOLOGY

Tuesday Evening, January 24, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. CLINICAL PRESENTATIONS
 - a. Meralgia paraesthetica, James H. Huddleson
 - b. Meralgia paraesthetica—a new etiological conception and its treatment, Byron Stookey
Discussion, Frederick C. Freed, J. Ramsay Hunt
- III. PAPERS OF THE EVENING
 - a. The convulsive state—general considerations, Samuel Brock
 - b. The eclamptic convulsion, William E. Caldwell
Discussion, Nellis B. Foster, Harold C. Bailey, Edwin G. Zabriskie
 - c. Birth injuries from the neurological and obstetrical viewpoint, Richard N. Pierson, Leon H. Cornwall
Discussion, Bernard Sachs, Joseph R. Losee, Alfred S. Taylor, Benjamin P. Watson, Louis C. Schroeder
- IV. EXECUTIVE SESSION

SECTION OF LARYNGOLOGY AND RHINOLOGY

Monday Evening, January 23, at 8:30 o'clock

Note Change of Date

ORDER

- I. PRESENTATION OF CASES
Neurosis of the nose, Wolff Freudenthal
- II. PAPER OF THE EVENING
The diagnostic barium bougie and lesions at the lower end of the esophagus. Lantern slides, Harris P. Mosher, Boston (by invitation)
Discussion by Henry H. Forbes, Charles J. Imperatori

FEBRUARY

STATED MEETINGS

Thursday Evening, February 2, at 8:30 o'clock

- I. EXECUTIVE SESSION
- II. SYMPOSIUM: ALCOHOLISM
 - a. Alcohol—its public health aspects, its abuses and uses, Charles Norris, Chief Medical Examiner
 - b. A study of the alcoholic content of autopsy material, and its bearing on the cause of death, Alexander O. Gettler, Assistant Medical Examiner (by invitation)

Thursday Evening, February 16, at 8:30 o'clock

- I. EXECUTIVE SESSION
- II. PAPER OF THE EVENING
Animal reservoirs of human disease with special reference to microbic variability, Theobald Smith, Director, Department of Animal Pathology, Rockefeller Institute, Princeton

SECTION MEETINGS

SECTION OF SURGERY

Friday Evening, February 3, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. PRESENTATION OF CASES
 - a. 1. Recurrent volvulus of the sigmoid
 2. Carbuncle of face, with staphylococcus sepsis and multiple bone foci
 3. Bilateral fractures of the femur, followed by anuria. Recovery after decapsulation, A. Hyman
- b. Cases illustrating the paper of the evening.

III. PAPERS OF THE EVENING

- a. The extension of the surgery of neoplastic diseases by endothermy, George A. Wyeth
- b. Functional restoration as an element in facial repair. Lantern slides. Cinema demonstration, J. Eastman Sheehan

IV. DISCUSSION

SECTION OF DERMATOLOGY AND SYPHILIS

Tuesday Evening, February 7, at 8:30 o'clock

ORDER

I. PRESENTATION OF PATIENTS

- a. Cases from the Polyclinic Hospital, Frederic Dillingham, Serafino Genovese, Jerome Kingsbury, Lawrence K. McCafferty, John Rothwell
- b. Cases from the City Hospital, A. Benson Cannon
- c. Miscellaneous cases

II. DISCUSSION

III. EXECUTIVE SESSION

Note: Examination of cases is limited to members and their invited guests.

SECTION OF PEDIATRICS

Thursday Evening, February 9, at 8:30 o'clock

ORDER

- I. THE KETOGENIC DIET IN EPILEPSY, Fritz Bradley Talbot, Boston (by invitation)
- II. THE KETOGENIC DIET, M. G. Peterman, Milwaukee (by invitation)
- III. DISCUSSION, Kenneth M. Metcalf (by invitation), Israel Strauss, H. Rawle Geyelin (by invitation)

SECTION OF OTOTOLOGY

Friday Evening, February 10, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. CLINICAL MEETING ON SUPPURATION OF THE PETROUS PYRAMID
 - a. Report of case with pathological specimen, I. Friesner
 - b. Report of case, E. L. Pratt (by invitation)
 - c. Report of case, W. C. Bowers
 - d. Report of case with pathological specimen, R. T. Atkins
- III. DISCUSSION, Wells P. Eagleton, Foster Kennedy, Alfred S. Taylor, I. Friesner
- IV. GENERAL DISCUSSION

SECTION OF NEUROLOGY AND PSYCHIATRY

Tuesday Evening, February 14, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. SYMPOSIUM ON DISORDERS OF THE SKIN, HEART AND ALIMENTARY CANAL DEPENDENT UPON DISORDERS OF THE CENTRAL NERVOUS SYSTEM
 - a. Some central connections of the vegetative nervous system, Smith Ely Jelliffe
 - b. Neurogenic and psychogenic disorders of the skin, Joseph J. Eller
 - c. Psychogenic disorders of the heart, John Wyckoff
 - d. Neurogenic disorders of the heart, Ernst P. Boas
 - e. Neurogenic and psychogenic disorders of the alimentary canal, John L. Kantor

Discussion, George M. MacKee, Fred Wise, Bernard S. Oppenheimer, Cary Eggleston, Walter A. Bastedo, Burrill B. Crohn, Foster Kennedy, Walter Timme, S. Philip Goodhart
- III. EXECUTIVE SESSION

SECTION OF GENITO-URINARY SURGERY

Wednesday, February 15

AFTERNOON PROGRAM
to be presented at

The New York Hospital, 8 West 16th St.

- 1:30 P.M.—Administration of sacral and parasacral anesthesia, Roy B. Henline
- 1:45 P.M.—Perineal prostatectomy on above case, Oswald S. Lowsley
- 2:15 P.M.—Report cases suffering from right sided pain who have been operated upon without relief, Francis P. Twinem (by invitation)
- 2:20 P.M.—Report of a new antiseptic (rivanol dextrose) for local application to mucous surfaces of the urinary tract, T. Clement Hill (by invitation)
- 2:30 P.M. Demonstration of pictures by artist, William P. Didusch (by invitation)
- 2:45 P.M.—Administration of paravertebral anesthesia, Roy B. Henline
- 3:00 P.M.—Nephrectomy on above case, Oswald S. Lowsley
- 3:30 P.M.—Demonstration of cases of incontinence of urine operated upon, Raymond M. Bowles (by invitation)
- 3:45 P.M.—Report on cases of polycystic kidney, Lisle B. Kingery (by invitation)
- 4:00 P.M.—Administration of sacral and parasacral anesthesia, Roy B. Henline

- 4:15 P.M.—Perineal prostatectomy on above case, Oswald S. Lowsley
- 4:40 P.M.—Demonstration of interesting pyelograms and post-operative cases, V. A. Nardiello (by invitation), Peter Lavallo (by invitation), F. C. Steinmetz (by invitation), J. R. Whisenant, R. Zeiss (by invitation), John Toole (by invitation), Cyril K. Church (by invitation), John Duff (by invitation), J. K. DeVries (by invitation), P. L. Helmick (by invitation).
- 5:00 P.M.—Ward rounds, Oswald S. Lowsley and staff

EVENING PROGRAM

to be presented at

THE NEW YORK ACADEMY OF MEDICINE

8:30 o'clock

- a. Comparative anesthetic activity of various local anesthetics including novocaine borate and tutocaine for the mucous surfaces of the urinary tract (5 min.), George A. Fiedler (by invitation)
- b. Case of spontaneous rupture of kidney due to malignant papilloma of the kidney pelvis (5 min.), Hubert A. Lyons (by invitation)
- c. The treatment of inoperable and post-operative cases of tuberculosis of the urinary tract (10 min.), William R. Delzell (by invitation), Stanley Wang (by invitation)
- d. Report of case showing tbc. in urine but no lesions in kidney (10 min.), Robert Gutierrez (by invitation)
- e. Pathological report of unusual specimens removed at operation (10 min.), Gilbert Daldorf (by invitation)
- f. Operative methods employed in kidney surgery (lantern slide demonstration) (10 min.), Thomas J. Kirwin
- g. Urological conditions in women (lantern slide demonstration) (10 min.), Frederick T. Lau
- h. Certain urological problems in children with report of cases (lantern slide demonstration) (10 min.), Paul M. Butterfield
- i. Operations upon the prostate gland (30 min.), Oswald S. Lowsley

SECTION OF ORTHOPEDIC SURGERY

Friday Evening, February 17, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. CASE PRESENTATIONS ILLUSTRATING OPERATIONS FOR OLD CONGENITAL DISLOCATION OF THE HIP
 - a. Shelf operation, 3 cases, Armitage Whitman
 - b. Deepening of acetabulum, 1 case, Irving Balensweig
 - c. Bifurcation operation, 1 case, Walter I. Galland (by invitation)

III. PAPERS OF THE EVENING

- a. Operative treatment of old congenital dislocation of the hip. Lantern slides, A. Bruce Gill, Philadelphia (by invitation)
- b. A review of end results of the treatment of congenital dislocation of hip, Richmond Stephens

SECTION OF OPHTHALMOLOGY

Monday Evening, February 20, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. PRESENTATION OF CASES
 - a. 1. Synchysis scintillans of the anterior chamber
 2. Thirty year old lachrymal gland tumor
 3. Bi-lateral irido-cyclitis (tubercular) precipitated by mild trauma, Ralph I. Lloyd
 - b. 1. Halo in glaucoma as seen and drawn by patient
 2. Cataract extraction ten years ago, in a case of retinitis pigmentosa, L. W. Crigler
 - c. Gumma of orbit, Kaufinan Schlivek
 - d. A button-like epithelioma involving the entire upper eye lid, cured by supersoft Roentgen rays, Joseph Jordan Eller
- III. PAPER OF THE EVENING
Eye and orbit phase of cancer work at the New York Skin & Cancer Hospital, George H. Semken
- IV. EXECUTIVE SESSION

SECTION OF MEDICINE

Tuesday Evening, February 21, at 8:30 o'clock

ORDER

- I. PAPERS OF THE EVENING
 - a. Dosage and clinical use of intravenous digitalis therapy, Harold E. B. Pardee
 - b. The cardio-tachometer: an instrument to count the totality of heart beats over a long period of time, Ernst P. Boas
- II. DISCUSSION BY T. Stuart Hart, Frank J. McGowan, Jr.

SECTION OF LARYNGOLOGY AND RHINOLOGY

Thursday Evening, February 23, at 8:30 o'clock

Note Change in Date

- I. READING OF THE MINUTES
- II. PRESENTATION OF CASES AND SHORT PAPERS
 - a. 1. Rhinolith necessitating external nasal operation for its removal
 2. Foreign body,—large piece of gauze in nose diagnosed as carcinoma, unexpectedly removed
 3. Improved local anesthesia for antrum puncture, M. C. Myerson

- b. 1. Teratoma of the naso-pharynx,—operation and end result
- 2. Lympho-sarcoma of the tonsil,—operation and end result, John M. Loré
- c. Radium in rhinoscleroma, G. Allen Robinson
- d. Surgical diathermy made possible in tonsil enucleation, F. Peter Herman (by invitation)
- e. Unusual pathological findings in the nose and throat. Lantern slide demonstration, Louise H. Meeker (by invitation)

SECTION OF OBSTETRICS AND GYNECOLOGY

Tuesday Evening, February 28, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. PRESENTION OF CASE
 - A case of spontaneous rupture of a pyosalpinx into the urinary bladder, S. di Palma, Meyer M. Stark.
 - Discussion opened by Walter T. Dannreuther
- III. PRESENTION OF INSTRUMENT
 - A self-retaining vaginal retractor, Isador W. Kahn.
- IV. PAPERS OF THE EVENING
 - a. A simplified method of testing tubal patency, I. Seth Hirsch, N. Shnayerson (by invitation)
 - b. The treatment of asphyxia neonatorum by means of alpha-lobelin injected into the umbilical vein, Robert A. Wilson (by invitation)
 - Discussion opened by Eliot Bishop (by invitation)
- V. GENERAL DISCUSSION
- VI. EXECUTIVE SESSION

- Morgan, T. H. *Experimental embryology.*
N. Y., Col. univ. pr., 1927. 766 p.
- Nelson loose-leaf living surgery. Editor in chief A. D. Whipple. 4 vols.
N. Y., Nelson, 1927.
- Nowak, J. *Documenta microbiologica. [Atlas]. Th. I. Bakterien.*
Jena, Fischer, 1927. 162 p.
- Panton, P. N. and Marrack, J. R. *Clinical pathology.* 2. ed.
Lond., Churchill, 1927. 459 p.
- Piéron, H. *Thought and the brain.*
Lond., Kegan Paul, 1927. 262 p.
- Pauchet, V. [et al.]. *L'anesthésie régionale.* 4. éd.
Paris, Doin, 1927. 382 p.
- Peltason, F. *Grundzüge der Röntgendiagnostik innerer Erkrankungen.*
München, Bergmann, 1927. 178 p.
- Pende, N. *Trattato sintetico di patologia e clinica medica.* v.1.
Messina, M. Principato, 1927.
- Petty, Sir Wm. *The Petty papers. Some unpublished writings.*
Lond., Constable, 1927. 276 p.
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- Pitt-Rivers, G. H. L. *The clash of culture and the contact of races.*
Lond., Routledge, 1927. 312 p.
- Porot, A. *Les syndromes mentaux.* v.1.
Paris, Doin. 1928.
- Putti, V., and Camucati, M. *I tumori delle ossa e la loro cura.*
Bologna, 1927. 159 p.
- Rosenfeld, G. *Diätikuren.*
Berlin, Fischer, 1927. 176 p.
- Roskam, J. *Physiologie normale et pathologique du globulin.*
Paris, Pr. univ. d. France, 1927. 151 p.
- Rost, H. *Bibliographie des Selbstmords.*
Augsburg, Haas, 1927. 391 p.
- Royster, H. A. *Appendicitis.*
N. Y., Appleton, 1927. 370 p.
- St. Hill, K. *Medical palmistry.*
Lond., Rider, [1927]. 132 p.
- Schlegel, E. *Die Krebskrankheit.*
Stuttgart, Hippok. verl., 1927. 291 p.
- Seifried, O. *Die wichtigsten Krankheiten des Kaninchens.*
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- Seligmann, E. *Seuchenbekämpfung.*
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- Shennan, T. *Post mortems and morbid anatomy.* 2. ed.
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- Short, A. R., and Ham, C. I. *A synopsis of physiology.*
Bristol, Wright, 1927. 258 p.
- Sobotta, J. *Atlas of human anatomy.* 3 vols.
N. Y., Stechert, 1927-28.
- Statesman and friend. *Correspondence of John Adams, with Benjamin Waterhouse. 1784-1822.* Edited by W. C. Ford.
Bost., Little, 1927. 178 p.
- Stiles, P. G. *Dreams.*
Cambridge, Harvard univ. pr., 1927. 80 p.
- Taylor, F. L. *Crawford W. Long and the discovery of ether anesthesia.*
N. Y., Hoeber, 1927. 237 p.
- Thiel, P. J. *Praktische Iriswissenschaft.*
Leip., Krüger, 1927. 64 p.

- Tómasson, H. Undersogelser over nogle af blodets elektrolytes (CA, K, NA, H), og det vegetative nervesystem.
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- Transactions of the American neurological association for 1926.
- Waldschmidt-Leitz, E. Die Enzyme.
Braunschweig, Vieweg, 1926. 233 p.
- Weidenreich, F. Rasse und Körperbau.
Berlin, Springer, 1927. 187 p.
- Whipple, G. C. The microscopy of drinking water. 4. ed.
N. Y., Wiley, 1927. 585 p.
- Whitehead, A. N. Symbolism.
N. Y., Macmillan, 1927. 88 p.
-

FELLOWS ELECTED FEBRUARY 2

- Mortimer N. Hyams, M.D., 78 East 79th Street.
- Philip Raphael Lehrman, M.D., 120 Riverside Drive.
- Samuel P. Oast, M.D., 30 East 40th Street.
- Henry B. Orton, M.D., 24 Commerce Street, Newark, N. J.
- Algernon Beverly Reese, M.D., 50 West 52nd Street.
- Samuel Rosen, M.D., 36 East 73rd Street.
- Irving Schwartz, M.D., 1150 Fifth Avenue.
- Carolyn Gay Williamson, M.D., 545 West 146th Street.
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DEATHS OF FELLOWS

GEORGE REESE SATTERLEE, A.B., A.M., M.D., 9 East 40th Street, New York City, graduated in medicine from the College of Physicians and Surgeons, New York City, in 1898; elected a Fellow of the Academy, January 5, 1905; died February 8, 1928. Dr. Satterlee was a Fellow of the American Medical Association, a member of the American Therapeutic Society, the American Gastro-Enterological Society, the Gastro-Enterological Society, the Pathological Society, and Attending Physician at Fordham Hospital. He was also Consulting Physician to the New Jersey State Hospital.

WILLIAM ARTHUR SHUFELT, M.D., 42 Park Avenue, New York City; graduated in medicine from McGill University, in 1881; elected a Fellow of the Academy, January 3, 1924; died January 27, 1928. Dr. Shufelt was Assistant Attending Physician to the Reconstruction Hospital.

JOSEPH JOHN SINNOTT, M.D., 10 S. 3rd Avenue, Mt. Vernon, New York; graduated in medicine from the College of Physicians and Surgeons, New York City, in 1903; elected a Fellow of the Academy, April 1, 1920; died January 26, 1928. Dr. Sinnott was a member of the Alumni Association of St. Vincent's Hospital, Surgeon-in-Chief at Mt. Vernon Hospital, and Consulting Surgeon to St. Agnes' and White Plains Hospital.

SIDNEY ARTHUR TWINCH, M.D., 24 Fulton Street, Newark, New Jersey; graduated in medicine from the College of Physicians and Surgeons, New York City, in 1890; elected a Fellow of the Academy, February 4, 1897; died, February 6, 1928.

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EDITORIAL A NEGLECTED MEDICAL SCHOLAR

It has long been known, to a relatively small group of cognoscenti, that the most considerable *Arbeit* in medical history which has yet come out of Great Britain was the work of a man condemned to a bizarre sort of professional ostracism, "sent to Coventry," in fact, not for any specific crime or misdemeanor, but for certain heterodox opinions which he maintained with obstinacy until the end of his life. So completely had the world passed him by that when he died few, even of those who knew him, realized that he had lived on into our period. Since his death, on June 18, 1927, there has been a swift change of front and, in an astonishingly short while, the two volumes of Charles Creighton's *History of Epidemics in Britain* (1891-4) have gone up in price and are eagerly sought for by collectors, if only as museum specimens of the typographer's art.¹ A critical examination of these volumes, which bear the *imprimatur* of the Cambridge University Press, will convince any candid and competent reader that their just reputation has suffered no *capitis diminutio* to date, that in all these 1589 pages of beautiful printing there is not a single typographic error of consequence (if any), while the dates and bibliographic references still bear the current acid tests (from whatever angle) with equanimity. Here, in fact, are calm, unruffled seas of accuracy upon which the amateur may float his pinnace with reasonable

¹ Bulloch says that the volumes were eventually unloaded on the market as "remainders" and could be picked up in the London book-stalls for a few shillings (*Lancet*, Lon., 1927, i, 250).

security from shipwreck and from the depths of which various divers have dredged up treasurer-trove not usually credited to the ill-starred author. But it is not merely as a source-book and storehouse of knowledge that this great work is outstanding, matching up, as it does, with Haeser's third volume (basic texts of epidemiology) or the monumental work of Hirsch, from which, in a manner, it derives. Creighton's book was virtually the point of departure of the recent British school of epidemiologists and is withal a narrative of events as compelling as Robinson Crusoe or Treasure Island, assuming, naturally, that the reader's interest is equivalent to the extent of his interest in the effect of epidemics upon the weal and woe of mankind. Read in the light of the military rule "Facts, not opinions, are wanted," everything is beautifully in its place and one can put his own interpretation upon the data, in the light of current advances in science. Concern yourself, however, about Creighton's tenacity of opinion as to miasms, effluvia, vaccination or the supernatural element (*to theion*) in influenza, and you will be at sea in several senses. At this time of day, it is cheap and easy to laugh or smile at Creighton's minute analysis of the pathogeny of typhus fever, with barely a reference to lice. But not so, if we reflect that both Tobias Cober (1606) and James Lind (1773) noted the coexistence of pediculosis and typhus without perceiving the causal nexus, which had to wait upon experimental inoculation. Lind, indeed, recommended, in a brief paragraph, the most approved Western Front methods of delousing prisoners exposed to jail-fever,² even pointed out that baking the clothes will delouse the clothes and check the possibilities of infection, yet was capable of the following *non sequitur*: Since sulphur is an efficient fumigant for typhus-infected clothing yet will not destroy lice, "we might be led to imagine that contagion is not propagated by animalcules." It

was Creighton who first assembled the dramatic experiences of the Black Assizes at Cambridge (1522), Oxford (1577), Exeter (1589), Taunton (1730) and particularly the old Bailey (1750), at which nearly the whole Middlesex jury, the Lord Mayor and some forty odd judges and officials on the left of the court-room were wiped out by typhus transmitted from the wretched lousy prisoners on the same side, while people on the right went unaffected; yet not a word does Creighton say of lice or of Lind's far-seeing observations of 1773.³ Neither the lice-ridden wigs of the judges and fair ladies, nor the long-handled curry-combs these ladies employed to scratch their backs nor yet the satiric boudoir allusions of Swift, Matthew Prior and Robert Burns (*To a Louse on a Lady's Bonnet*) could awaken Lind or Creighton to what (to us) seemed staring in their faces. Their minds were closed to the idea of specific infection by living vectors, yet profiting, as we do, by the accumulated wisdom and knowledge of the past, nothing can redeem our own ignorance and impotence with reference to the great epidemic of influenza of 1918-19. "Honors are easy" to those inclined to laugh at Creighton's grave consideration of the original meaning of influenza (a mysterious "influence" in the air), of the infectious boat-cold of St. Kilda which puzzled Dr. Johnson and Boswell in the Hebrides, of mysterious colds breaking out on ships approaching a shore or among 'longshore people approached by a ship, of the coincidence of yellow fever with earthquakes or other upheavals of the soil, with but a solitary reference to mosquitoes. The true merits of Creighton are of an entirely different order. He derived his inspiration from Hirsch's *Geographical and Historical Pathology* (1883-6), which he translated for the Sydenham Society (1883-6), and his own performance was in every way worthy of the enduring model he had chosen. In both, we find the same careful assemblage and close

³ The essential facts about louse-transmission of typhus at the Black Assizes were first brought out in the brilliant paper of Lieut. Col. MacArthur, R.A.M.C., on "Old-time Typhus in Britain:" *Tr. Roy. Soc. Trop. Med. & Hyg.*, Lond., 1927, xx: 487-503.

analysis of statistics, the same cautious, conservative handling of etiological theories, the same unimpeachable accuracy in citation and reference; but Creighton displays a feeling for the dramatic and ironic essentials in narrative writing which Hirsch does not possess. Creighton's analysis of the conditions which exposed Ireland to dysentery and typhus fever for centuries, of the transmission of these diseases by her emigrants at Bristol, Liverpool and other ports of embarkation, his sly observations on the statistics of pock-marked faces among the great ladies of the 17th century, on the endemic status of smallpox in England and the role of improved sanitation as a coefficient in its decline, his derivations of the words "measles," "pox," "influenza," "dengue," his exegesis of Sydenham's cooling regime in smallpox, are all original with himself, the honest products of a vigorous, tenacious, extremely active mind. Could anything be more definitive, conclusive, effective and to the point than his re-enforcement of John Hunter's sally as to the supposed American or Columbian origin of syphilis?

"There never was any considerable body of facts, consistent as regards times and places, in support of that theory; and, on antecedent grounds, the objection to it was that it is as difficult, to say the least, to conceive of the origin of such a disease among the savages of Hispaniola as among the natives of Europe. 'Here or nowhere is America' is the proper retort to all such visionary theories put upon the distant and the unknown. The American theory is now hopelessly dead; the more that the New World became known, the less did syphilis appear to be indigenous to it; indeed the disease followed the track of Europeans, and those parts of the American continent, north and south of the Isthmus, which were longest in being reached by the civilisation of the Old World, were also longest in being reached by the lues venerea."⁴

Sudhoff, Sigerist and other historians have adduced a convincing array of facts tending to prove that syphilis existed in Europe long before 1492, but as far as the *morbis americanus* phase of the theory goes, Creighton's brief

⁴ Creighton. *History of Epidemics in Britain*. Cambridge, 1891, i: 430.

paragraph conveys the sound sense of the whole matter. As Lord Kelvin once said, in a similar relation: "It is all there: there is nothing to be added." So too, the essential data of the history of variolation, as an historic episode as far reaching in its potentialities as Jennerian vaccination, were first assembled and interpreted in the 130 pages which Creighton devotes to the subject.⁵ The finishing touch, the view of variolation as the initial world-wide, century-long experiment in preventive inoculation, a view of things to which Creighton remained impervious, was added in the monograph of Klebs (1914).⁶ The same debt is acknowledged in Crookshank's suggestive book on Influenza (1922) and in the views enunciated by Greenwood, Hamer and other recent English epidemiologists, who derive from Creighton. The crux of this reasoning is the pseudo-Hippocratic *to theion* (*quis divinum*)⁷ which Creighton invoked in lieu of the "epidemic constitution" (*genius epidemicus*) of Baillon and Sydenham and the "cosmic and telluric influences" Pettenkofer attempted to resolve into three algebraic (x, y, z) factors.

It remains to give some brief account of the life of this remarkable medical scholar. Charles Creighton was born at Peterhead (Aberdeenshire), Scotland, and graduated from the University of Aberdeen in 1867. After taking medical degrees at Aberdeen (1871) and Edinburgh (1878), he set out on his *Wanderjahr* and spent a long time under Virchow (Berlin), Rokitsansky and Skoda (Vienna). Returning to England, he was successively medical registrar at Charing Cross Hospital, surgical registrar at St. Thomas's Hospital, demonstrator of anatomy at the University of Cambridge (1877-81) and for a time worked under Burdon Sanderson in cancer research and other pathological problems. While in residence in Savile Row and New Cavendish Street (London), he at-

⁵ *Ibid.*, 1894, ii: 463-593.

⁶ Arnold Klebs: *Die Variolation im 18ten Jahrhundert*. Giessen, 1914.

⁷ Pseudo-Hippocratic because completely at variance with the rational views of causation apparent in the authentic parts of the Canon.

tempted practice, but as might be expected in a Skoda pupil, he made nothing of it. During the period 1881-1918, he spent all his time at the British Museum and other libraries, delving for the materials of his two principal works. His translation of Hirsch (1883-6) required twelve hours work a day for three years, his book on Epidemics in Britain a similar amount of labor during 1887-94. He published several books on cancer, tuberculosis, diseases and tumors of the breast, to which he attached most importance, but these, as reflecting the dyscrasic hypothesis of his master, Rokitansky, are now forgotten. In 1887-8, came his break with British opinion on the subject of vaccination and the end of his professional career. After the war, he was pensioned by Lord Oxford and lived in retirement at Upper Bodington until his death. Creighton's unworldly character, in relation to the tragedy of his life, is best appreciated in the words of his friend, Professor William Bulloch:⁸

"He seemed to have some mental twist which prevented him seeing things as other people saw them. That he implicitly believed all that he wrote I have no doubt, and he was fearless of the consequences and honest to the point of injuring himself and his prospects. He exhibited a complete indifference to the most hostile criticism and bore no grudge. He was contented and cheerful and an admirable companion. He seemed possessed of some cacodæmon, which was entirely inimical to worldly success, for which Creighton, however, cared not a jot. Throughout life he was a poor lonely bachelor, leading a most frugal and physiological life and solely concerned in digging the claim which he had pegged out by himself and for himself. He simply could not acclimatise himself to modern theories of disease. He belonged medically to another age; he lived in a world of miasms and effluvia rather than particulate contagion in the form of bacteria. He was of the dyscrasic school of Rokitansky in pathology. But he was in no sense of the word antiquated in his learning. His knowledge was of the most modern kind and of the widest compass. Although he was familiar with all the methods of section-cutting and staining, he pinned his faith on sections cut with a razor from tissue, embedded in a 'penny dip,' and stained with ink.

"The real tragedy of Creighton's life was connected with his views on cow-pox and vaccination. For many years he had been the intimate friend of Robertson Smith, the theologian and Arabic scholar, who was editor of the ninth edition of 'Encyclopædia Britannica.' Robertson Smith got Creighton to write for the Encyclopædia the articles on malaria, medicine, Morgagni, pathology, pellagra and vaccination. The last-named article, published in 1888, literally sealed Creighton's fate. Based on an extended study of the original data, he came to the conclusion that Jenner's work was incorrect, and that cow-pox was not as Jenner stated 'variola vaccinae.' In Creighton's view, cow-pox had nothing to do with variola and was not a protective against variola. He even went further and maintained that what had been described as vaccinal syphilis was not venereal pox at all, but part and parcel of the cow-pox infection in the human being. Before the publication of the Encyclopædia article he had given evidence in a book published in 1887 that he held this view. He was at once hailed by the anti-vaccinators as a valuable recruit to their ranks and by the medical profession as a renegade to be treated with disdain and obloquy.

"Recusancy has its own disadvantages. The issue between Creighton and general professional opinion on vaccination was not thrashed out there and then, as it ought to have been. It was deemed more expedient to drop Creighton into oblivion, and if he was ever referred to at all it was only as 'Creighton the Anti-vaccinator.' All his other work was forgotten in the débacle, and he was a doomed man. He came to the front for a short time a decade later with some views on plague, which he had been enabled to study in India through some fund placed at his disposal. He could not be brought to believe that *Bacillus pestis* played any important part in the disease, which he regarded as merely an abstract something inherent in the soil. In his journey to the Punjab it was a peculiar pleasure for him to have stood by the Hydaspes where Alexander defeated Porus. He had no doubt that he had discovered the long-disputed site of the battle.

In person Creighton was a tall, handsome, well-preserved man—the photograph shows him at about 60 years of age. He was throughout life fond of music and was a great walker. It is a pleasure to me to try to perpetuate the memory of a learned philosopher who,

although by nature the very antithesis of myself, was a good friend. In the opinion of many he was harshly treated by the world for holding views that did not conform to standard. Perhaps this very world has become more tolerant than it was in Creighton's time, because even in his own subject there are epidemiologists who express with impunity to-day views as heterodox as those for which Creighton was pilloried and ostracised 40 years ago."

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ANIMAL RESERVOIRS OF HUMAN DISEASE WITH SPECIAL REFERENCE TO MICROBIC VARIABILITY *

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The subject assigned me, I take it, is to give you a brief summary of those human diseases which we owe to animal life and which the physician is apt to encounter from time to time in his practice or discover in the hospital and dispensary. In more general terms, I am to discuss the pathological relations between the human and animal species. Leaving aside acute poisoning due to the sting of certain insects and the bite of serpents, these relations are limited largely to the transfer or interchange of infectious and parasitic organisms. Two main groups of diseases spring from this relationship:

a. Infectious and parasitic organisms producing self-perpetuating diseases in animals may at times and under certain circumstances gain a foothold in the human subject. These diseases are as a rule not transmitted from one human being to another, either because the virus is not eliminated or else the mode of infection is peculiar. Or again, the highly developed sanitary environment of patients may prevent such transfer. Among these diseases may be mentioned antirabies, tuberculosis, Malta

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fever, tularemia, melioidosis, glanders, Rocky Mountain spotted fever, streptococcus infections, various tapeworm diseases, and trichinosis.

b. Diseases due directly to biting insects and arachnids. They comprise a formidable group which hovers forbiddingly over immense areas of the world's surface otherwise highly desirable for civilized man. In addition to the major plagues such as malaria, yellow fever, typhus, sleeping sickness, and trench fever, there are various minor diseases due to insects. It may seem somewhat strained to call these animal diseases yet such they are. The protozoan parasites which they inject into the human subject belong primarily to the insects and arachnids. In them the important sexual stages for the perpetuation of the species go on. The human host is a convenient secondary culture medium for the multiplication of the vegetative stages giving rise to a large asexual progeny which withdrawn into the insect goes through the maturing sexual stages. Some of these protozoa have through this procedure sacrificed the capacity of independent existence in the insect owing to their parasitic or semiparasitic reliance on the human subject. Nevertheless all zoological evidence points to insects as the real, primary hosts. This second group of diseases I shall not further discuss, since it forms the material on which tropical medicine is built.

The animals which contribute to human disease may be divided into useful and noxious species. From a scientific viewpoint the distinction is of no value. It becomes, however, very significant when we endeavor to suppress the diseases. We may make continuous, relentless warfare on rats and mosquitoes, but the problem becomes more complex when we deal, for example, with cows as reservoirs of human diseases. Medical literature abounds in references to the possibilities of harm lurking in animal diseases, and in nearly every great epidemic of the past, animal diseases have been reported as precursors. Bold inferences were drawn from mere relations in time and space and fanciful theories have had their days, such as the one that bovine

tuberculosis was human syphilis in the cow. With the coming of scientific medicine animal diseases have taken their proper place in etiology and it may be said that in spite of our intimate association with animal life, either through direct contact, as in farm life, or indirect through foods and other animal products, and in spite of the large number and variety of infectious and parasitic diseases belonging to every species of domesticated and wild animal, so far as the latter are known, very few are transmitted to man. In fact we have only an odd lot of diseases to consider. Nevertheless they are formidable, and unheeded and neglected they would give the human race many unexpected jolts from time to time.

With one exception the diseases to which I shall refer briefly tend to occur either sporadically or in small groups. They first come to the attention of the practising physician. One acquainted with the chief clinical manifestations of these diseases may well score a point if he should be able to make an early diagnosis. Such diagnosis will be frequently tentative because a final decision will depend on bacteriological and serological tests. To direct the investigation into the right channels means half the battle won. To-day such diseases, after they have been identified, usually come under the jurisdiction of the health officer who endeavors to trace the source of the infection and eliminate it if possible. Diseases of this class new to a given region are usually ranged under some known disease at first and the erroneous diagnosis often carried along for months before it is rectified.

The object of a lecture of this kind is not fulfilled by simply detailing what is already recorded in medical writings but to point out relationships and possibilities still hidden in the future. To do this we necessarily enter the field of speculation. I think that there is perhaps too little rather than too much speculation in medical discussions to-day. The one condition not often met is that to look into the future we must be firmly planted in the present. To provide a basis for such speculation I shall briefly

give the salient characteristics of the important diseases that come within the scope of our subject.

Glanders is a dangerous and frequently fatal disease, sporadically encountered in man, which is exclusively carried by diseased horses and their relatives, the asses and mules, although it is inoculable into a large number of other animals. Before the entrance of the automobile into industrial life, glanders was not uncommon. In fact twenty-five years ago there was a fair amount of this disease traveling daily over our city streets. It caused the death of a number of scientists and their helpers in the laboratories. Medical literature is replete with details of cases in men in contact with diseased horses. The open disease in horses is readily diagnosed and the earliest stages brought out by mallein. Health boards were quite alert in stamping out the disease by killing open cases and watching those which reacted to mallein. To-day it is fairly well suppressed, thanks to the diminution of horses and the activities of Health agencies. In man the disease takes on protean characteristics from chronic lesions of the skin lasting twenty years to acute septicemic cases fatal in a few weeks. It has been repeatedly and thoroughly monographed in medical serial publications so that there is no difficulty in getting acquainted with the human side of the disease.

Bubonic and pneumonic plague. The relation of rats and certain rodents to bubonic and pneumonic plague was established fully a generation ago. Since then sporadic outbreaks of this disease have made themselves felt in widely separated territories, and during such occurrences, plague rats have regularly been found in the infected territory. In the far west of the United States other rodents, such as ground squirrels, have been found dangerous carriers. The microbe is one of a large group infesting the respiratory tract of the lower animals but singled out by its fierce onslaught on the human species. It is well known that the bubonic form of plague is not readily passed from man to man, probably owing to the fact that the mode of

introduction of the human virus into a fresh wound would rarely occur. The diseased rat aided by the bite of the rat flea provides the necessary mechanism between rat and man. On the other hand the pneumonic form may be transmitted like other respiratory infectious agents directly. Originally derived from a rodent of woodchuck type, it becomes a genuine human plague. The Black Death of the Middle Ages is generally identified with the pneumonic type of plague.

Malta or undulant fever. Since the great war attention has been called by clinicians to an affection appearing in our midst sporadically and usually in isolated cases which is characterized by prolonged fever without recognizable local manifestations. Its similarity to Malta fever, traced by Bruce and co-workers nearly forty years ago to goat's milk around the Mediterranean where this beverage is used extensively in place of cow's milk, has been emphasized. From the greater number of recent cases a bacillus has been obtained from the blood which closely resembles *Bacillus melitensis*, or *Brucella* as it has been recently renamed in honor of Bruce, the first to cultivate the organism from the goat. In 1918, Alice Evans while studying the bacteria in cow's milk showed that *B. melitensis* was closely related to *B. abortus* from the cow. Although the former had been isolated in 1889 and the latter, by Bang, in 1897, the close relationship of the two was not pointed out until twenty years later. This condition may be ascribed to the fact that the two streams of information resulting from investigations in human and animal pathology rarely mingle.

The appearance of an undulant type of fever in man in our midst associated with an organism up to the present not distinguishable by routine bacteriological and serological methods from either *B. melitensis* or *B. abortus* raises many important problems which cannot be reviewed at this time and which demand more detailed study. The situation may be briefly defined as follows. There are at present three different hosts of *Brucella*, the goat, the pig

and the cow. The bovine organism has been thoroughly studied; the pig organism much less thoroughly. The goat organism, known to exist among goats in southern Europe and in several southern states in this country, is still to be comparatively studied, as coming directly from goat's milk. Only through an extensive comparative investigation of these three races of *Brucella* will the problem of human undulant fever be solved. Among fifteen human strains so far examined I find at least three varieties and none agreeing in all cultural characters with the bovine type. It may be claimed that the latter is modified by passage through man, but in default of the actual human experiment, this gap in our knowledge can only be filled by continued cumulative study of accessible material. The burden of proof still rests upon those who claim that the bovine type of *Brucella* produces undulant fever in man. Bacteriologists working with cultures of Malta fever are frequently laid low with the disease in spite of the usual care observed in bacteriological laboratories. On the other hand *B. abortus* from the cow has been under investigation for more than a quarter century the world over without being suspected of producing any febrile conditions in laboratory workers who have not protected themselves in any special manner. Moreover veterinarians coming directly in contact with the diseased tissues in their daily practice have not presented any grievances against the bovine bacillus.

In 1912 Whitmore, an Englishman working in the Far East, called attention to a bacillus which may be destined to play an important role in world history. The bacillus has characters reminding one in turn of the typhoid bacillus, of proteus and of glanders, but it is not like any of these. It may be a highly generalized type from which those mentioned have sprung. Since 1912, the disease it induces has been encountered spontaneously in rats, guinea-pigs, rabbits, cats, dogs and a horse. Up to 1924, the human disease was localized in Rangoon, Burma, and the Straits Settlement. Fifty cases have been studied, of

which forty-eight have died. The two survivors are chronically diseased. The human disease resembles in some respects acute septicemia or cholera or glanders, according to the cases observed. Diagnosis was made in most instances after death, since the cases were regarded as known human diseases during life. Owing to the variety of localizations the bacillus has been isolated from sputum, local ulcers, urine and the blood during life. The rat may be the true carrier and disseminator.

Tularemia. This disease has been the theme of a recent lecture by Dr. Edward Francis who has devoted much attention to a study of its distribution in the United States and the modes of transfer. I am therefore restricting my remarks to some of the salient points in its natural history. It is essentially a disease of rodents and was discovered in 1912 by Drs. McCoy and Chapin in California ground squirrels. Two years later Wherry and Lamb described the first case in man. In 1919, Dr. Francis studied a small group of cases in farmers, in Utah, and traced the infection to jack rabbits. He also showed the ready transmissibility of the virus through the mechanical agency of various insects and mites living on or drawing blood from diseased animals. The clinical manifestations following infection consist of inflammation and suppuration of the regional lymph nodes, and fever lasting some days and after an intermission returning. Convalescence is slow. The mortality may be high in certain outbreaks. Laboratory workers are prone to contract the disease. The disease has been reported from all parts of the United States and is generally due to handling the carcasses of wild rabbits, such as skinning and preparing them for food. Within a few years, several cases of the human disease have been reported from Japan and the disease identified by Francis as tularemia.

Rat-bite fever. This disease has been definitely associated with the bite of rats in widely separated countries, among them Japan, Mexico, Scotland and the United

States. The wild rat during the biting introduces into the wound a spirillum, possibly also other organisms, in the saliva. The disease in man is characterized by a relapsing type of fever with an inflammatory reaction round the wound, enlargement of regional lymph nodes, and a macular, erythematous eruption. The clinical reports vary in details and minor particulars but fundamentally they are alike. The spirillum when inoculated in infected blood multiplies in the rat, guinea-pig and rabbit. In the rat and guinea-pig conjunctivitis and keratitis are observed and it has been suggested that the saliva of the rat is infected by the conjunctival discharges.

Infectious jaundice or Weil's disease. We are indebted to the rat for another characteristic human disease, which like rat-bite fever has a world-wide distribution. Infectious jaundice has played a prominent role among soldiers in various wars of the 19th century. The relation of the rat to this disease and the causal agent, a spiral organism, *Leptospira icterohemorrhagiae* were demonstrated by Japanese scientists in 1916. The disease is characterized by sudden onset of fever, severe muscular pains, and jaundice usually on the fourth day. Hemorrhages are usually present. Albuminuria is frequently observed. A second elevation of temperature, known as after-fever, may occur after subsidence of the first febrile reaction.

The foregoing group of disease, although differing widely etiologically, have in common the sudden onset with fever. They also are blood diseases in so far as the infectious agent may be recovered from the blood during life. Localizations, either primary or secondary, are frequent, and when primary, the regional lymph nodes are involved. The mortality is low, if we except melioidosis in which it appears to be very high. There is furthermore the relapsing character of the fever common to most of them. The entire symptomatology indicates a lack of stability of the microorganism in the foreign host, accompanied however

with a high invasiveness and persistence. Widely different from one another are the following highly important animal diseases transmissible to man:

Anthrax. The anthrax bacillus has always been a classic to the bacteriologist since it was the first microbe actually seen in the blood of affected animals and also the one with which Koch over fifty years ago began his career and Pasteur gained recognition through his now celebrated anthrax vaccine. The disease is always treated in clinical and pathological texts and I need not delay on it. The bacillus is quite a universal agent, since it attacks horses, sheep, and cattle, and perhaps many wild species on pastures. The dangerous factor in its makeup is the spore which survives in a dry condition many years. I have myself kept dried spores eight years and found them making abundant growth overnight when placed in suitable culture media. The wool, hairs, bristles and hides of domestic animals are dangerous vehicles of these spores and governments have been trying for many years to devise successful disinfectants which will not materially injure these articles of commerce and industry. Inasmuch as there is no evidence that healthy animals carry the infectious agent the danger to human beings is very slight, provided the governments do their duty in not allowing the products coming from animals dead of anthrax to enter commerce at all or at least without adequate disinfection.

Rabies, like anthrax, has a wide spread among animal victims and almost all mammals tried have been found inoculable. The real distributors, however, are limited to the species that bite, the dog and wolf. Casual transmission by other rabid animals may occur through their saliva but this is rare. There is no other disease known which inclusive powers to infect and cause fatal disease. As Pasteur's genius has provided a defense as tularemia, of vaccination. The increasing extent and

Rat-bite fever is among dogs in densely populated territories with the bite of the globe have stimulated efforts to prevent among them Japanese measures for dogs with a modified

Pasteur vaccine. Such procedure is now being tried in certain communities but without the scientific centralized oversight which such an important practical experiment demands. The great international importance of rabies is expressed in the International Conference on Rabies held in Paris in 1927, during which all the various procedures used on human patients were discussed and scrutinized.

Paratyphoid diseases. Another widespread group of bacteria producing septicemic and enteric diseases in animals and not infrequently group outbreaks in man is the paratyphoid group including *B. enteritidis*, related on the one hand to the typhoid bacillus, on the other to certain races of *B. coli*. In man this species of bacteria is most frequently associated with acute gastrointestinal upsets, leading in rare instances to a fatal outcome. In another group of cases the disease simulates typhoid but is less severe, less protracted and rarely fatal. Where man acquires this infection has been the subject of research for nearly forty years and enquiries are still going on. The reasons are not far to seek. The paratyphoid group of bacteria produces enteritis in cattle and swine, and abortion in mares. It produces epidemics among rabbits, guinea-pigs and mice in our laboratories, and in wild rats. It is represented by several distinct serologic groups which break up into minor subgroups. In the smaller animals several races may infest the same species at the same or different times. Certain group outbreaks in man have been definitely traced to rats and to veal, horseflesh and pork, when not sufficiently cooked. It is not improbable that the strains infesting the larger animals are distinct from one another but that the smaller animals are susceptible to all. It may be that the rat is an exception and cultivates its own variety. The difficulty with the mass of researches upon the paratyphoid races has been too great attention to nondescript cultures with no history and too little to the larger animal hosts.

Tuberculosis. So much has been written during the past twenty-five years on the significance of bovine tuber-

culosis to the human race that I can add little to the subject not already well known. The transmission of the bovine tubercle bacillus occurs almost exclusively in cow's milk. In the second and more advanced stages of the disease, the udder may become the seat of tuberculous processes due to the escape of bacilli temporarily circulating in the blood as the result of some focus breaking down. About one to two per cent of tuberculous cows have some tuberculous foci in the udder. Cows in very advanced stages of the disease, when emaciation has set in and the disease has become generalized, may discharge a few bacilli in the udder. The cow's chief form of tuberculosis is pulmonary. The cow coughs up particles of caseous material and mucus impregnated with tubercle bacilli. This coughed-up material is chiefly swallowed but some is thrown out during coughing, otherwise it would be difficult to account for the preponderating pulmonary disease of the cow herself. The swallowed bacilli are discharged in the feces and when the milking is not guarded by preliminary cleansing of the cow, some of these bacilli may find their way into the milk pail with fecal matter. This source of bacilli cannot be significant owing to various inhibiting conditions. It has, however, not been quantitatively studied.

The main points upon which agreement is general are that children under five are almost the only victims, that the cases of subcutaneous lymph node tuberculosis due to the bovine bacillus are relatively benign, and that, according to a careful study of the statistical evidence of Cobbett, between five and six per cent. of all deaths from tuberculosis are attributable to the bovine virus. In view of the data on hand, pasteurization of milk is gradually being introduced in large cities. Fortunately, the thermal death point of tubercle bacilli is low. The eradication of bovine tuberculosis is now being pushed by State and Federal activities in the hope of establishing permanently tuberculosis-free areas and gradually increasing such areas until the disease has been eliminated. The method used is to kill all animals reacting to tuberculin and repeating

the procedure every six months until reactors are no longer encountered. The entire movement is tedious, expensive, and fraught with difficulties tending towards relapses. These are attributable to failures of the tuberculin, carelessness in administering the test and in interpreting results, introduction of infected animals, and reintroduction of the virus from feed, swine, dairy products and the like. Although the problem of bovine tuberculosis may be considered temporarily and practically disposed of by the use of pasteurized milk and the continued killing of tuberculin-reacting bovines, the scientific aspects are not so satisfactorily cleared up. The reason for the immunity of the human adult is not in sight since many must be exposed in cow stables to bovine bacilli. The existence of atypical forms as described by Griffiths needs more detailed study. Some method of recognizing the presence of the bovine type in the human body would be of great value to the clinician and surgeon.

Rocky Mountain Spotted Fever. A disease of startling possibilities but restricted by advancing agriculture is the Rocky Mountain spotted fever which first came to the notice of medical science in the nineties of the last century. Since then numerous papers have been published by various investigators and some very valuable data brought to light. The human disease is an acute febrile disease, characterized by an eruption of spots, varying much according to the severity of the attack from bright red to purple and becoming petechial in character. The mortality is high. In 1903, 121 cases had been collected, of which 84 were fatal. The immediate incitant is a tick, the bite of which injects the virus. This mode of transmission accounts for the non-contagiousness of the human disease, observed by all local physicians. The demonstration of the infectivity of the wood tick was given by Ricketts in 1906. He also was able to induce the disease in guinea-pigs which animals in turn infected ticks placed on them. He furthermore showed that the virus may pass to the ova of the infected female tick and thence to the next generation. Ten years later, Wolbach demonstrated the presence of minute

else transferable from animals to man. Certain tapeworms have figured conspicuously in the past in those countries where certain kinds of meat are eaten raw. Thus the beef tapeworm lives in the human intestine in the adult form and in muscular tissue of cattle in the larval or cysticercus stage. The pork tapeworm enjoys the same dual hospitality in man and the pig. When human beings eat the cysts in raw or underdone beef or pork, the intestines may become the seat of the respective tapeworm. The fish tapeworm, not infrequently encountered in eastern Europe, has probably established itself recently in some of the inland waters of the United States. Carried across in the intestines of some European immigrant and discharging countless ova, the parasite thus furnished the opportunity for fishes to become infested with the intermediate or larval stage. Another tapeworm (echinococcus) belonging in its adult, intestinal stage to the dog has figured more or less in the medical and surgical literature of the past because the intermediate larval stage following the ingestion of ova discharged by the dog has been found in almost every organ of the human body, notably the liver in which organ large cysts develop gradually. These may break and when situated in vital spots, such as the medulla oblongata, they have caused instant death.

Another strictly animal parasite which has played a conspicuous role in human pathology in the past, especially in central Europe, is the roundworm, *Trichinella spiralis*. It has caused extensive local epidemics with high mortality following the consumption of the raw muscular tissue of a single pig. Trichinosis is not unknown even today when unfortunates consume inadequately cooked pork. The parasite is attributed to the pig, but it occurs in rats and small laboratory animals have been infected successfully. All that is necessary to maintain the disease is for the pig to eat an infected rat and for another rat to gnaw the body of the infected dead pig and so on *ad infinitum*.

Having catalogued briefly most of the conspicuous maladies which we derive from animal reservoirs, it may be

worth while to pass in review the animals themselves. Here our division into useful and noxious may be followed. The cow has been responsible for the beef tapeworm, certain types of paratyphoid infection, tuberculosis, septic sore throat, and very doubtfully for cases of undulant fever. Anthrax cannot be charged to the cow exclusively, since it attacks other domestic animals. Hides may carry spores, however, and permanently infect grazing lands irrigated by water from tanneries and other factories working up hides, wool, hair and bristles. Sheep are of relatively little significance as carriers of human disease if we except wool impregnated with anthrax spores. Swine are responsible for trichinae, the pork tapeworm, paratyphoid infections and probably certain forms of undulant fever. Though they are victims of bovine tuberculosis whenever exposed, it is doubtful that human beings, excepting perhaps butchers, are infected from pork owing to inspection in large cities, the freedom of muscular tissue from foci and the general custom of cooking pork. Horses are the source of glanders, of anthrax in horse hair and hides and possibly of certain races of paratyphoid. Dogs are responsible for rabies and the echinococcus tapeworm.

Among the noxious mammals, rats stand at the head, as potential reservoirs of bubonic plague, of the spirilla of rat-bite fever and melioidosis, as well as the spirochæte of infectious jaundice, and certain races of paratyphoid bacilli. Mice, as the most domestic of noxious pests, are minor reservoirs of plague bacilli, of certain skin affections, and being subject to various paratyphoid infections, potential reservoirs of these as well. Among game we are aware of the wild rabbit as carrier of the tularemia virus, sphermophiles of plague when endemic, and of various species of game as sources of the Rocky Mountain spotted fever virus.

If we now reverse the emphasis of our theme and ask how many human diseases are transmitted to animals there is very little to discuss. If a disease passed from animal

cowpox and horsepox which indicates that they may have been originally derived from the same ancestral type.

Preceding the introduction of solid culture media by Robert Koch, and therefore preceding the beginnings of bacteriology as a science, there were current more or less fantastic ideas of the variability of microorganisms which if accepted would have negated the possibility of recognizing any definite etiological factors in infectious diseases. Hence with the introduction of methods to test these current ideas the relative stability of bacterial species was soon universally accepted. This salutary change was not without certain disadvantages for it put off the study of variability many years. In human medicine this disadvantage played only an insignificant role since the first pathogenic species to be discovered were usually invasive forms and quite stable. To those who studied disease from a comparative standpoint with an abundance of material, variations promptly presented themselves, especially among paratyphoid strains, among glanders and among tubercle bacilli. Even in the strictly human camp violent controversies arose over the significance of variants in the etiology of Asiatic cholera. Since then every conceivable species of bacteria capable of growing on artificial substrates has been found to be made up of a group of variants. The variations were grounded either in slight differences as to fermentative capacities, pigment and capsule production, or in varying capacities to produce toxins or to respond to immune bodies. Even the latest subject of research, the streptococcus associated with scarlet fever, is found endowed with slightly varying characters.

Among the invisible filterable causes of disease the determination of cultural and physiological variants is at present impossible owing to the fact that artificial culture in the bacteriological sense is not yet attained. But even in this group two immunologically different races have been found in the virus of foot-and-mouth disease. Smallpox prevails under the guise of the usual form and a milder type, *alastrim*. Numerous illustrations might be given,

involving practically every human and animal disease studied, of the universal occurrence of variant types.

That there are numerous physiological differences and diversities among the races of man and animals upon which the microörganism parasitize is so well known that I merely mention it. The differences are accentuated when several host species of animals are inoculated with the same microörganism. Then also there are discovered certain peculiar, accidental relationships among hosts which a given virus might utilize. Thus the house mouse is not susceptible to glanders but the field mouse is. Mouse septicemia bacilli are quite virulent for pigeons. In fact all that has been stated in this lecture serves to illustrate both host specificity and the occasional breakdown of this barrier.

Going parallel with observations in natural disease, laboratory studies by many scientists extending over many years have brought to light fluctuations, modifications, mutations and dissociations of physiological and morphological characters of bacteria as well as increase or decrease in virulence through serial passages through animals. In spite, however, of these changes, suggesting both degeneration and regeneration, and the sudden appearance of hitherto latent characters, the different cultivable species of bacteria remain true to a certain fundamental type within which the variations occur. This leads us to the concept of microörganisms as possessed of a number of more or less independently variable characters, morphological and physiological, some of which may be augmented, depressed, or lost, or even appear as new characters. Among the pathogenic forms the increase in toxin production, the appearance of defensive envelopes may modify disease. In fact there are probably multiple toxins of different activities as well as multiple types of defense, each brought into action by certain specific, but accidental, host relations, making possible new diseases whenever the special relationship is tapped by the accidental meeting of certain hosts and certain microörganisms. Thus *B. abortus*

from the cow, passing to swine and remodeled in this species, may accidentally pass back into the cow's udder as pathogenic for some human beings.

Taking these facts into consideration and the increasing number of new trials open to microbes to become established in new hosts made possible by the continuous flux of an increasingly dense population of both human and animal species, domesticated or merely parasitic on conditions produced by domestication, we may begin to visualize the possibilities for new diseases to appear. They may come more or less suddenly when conditions are rapidly altered as in war for man, and in rearing large numbers of animals in confinement with regular and frequent communication with other similar populations. We may readily conceive of the many changes in infectious organisms partly accomplished, followed by the destruction of the new race because some conditions are not fulfilled, and hence the many failures which precede what we may call the birth of a new disease. In this highly significant process the original character of the aberrant parasite may be so altered that its source cannot be traced. Its course may have been devious and the intermediate stages unobserved when they occurred and since wiped out, so that this course can no longer be traced back to its beginnings. The appearance of apparently new diseases associated with ultramicroscopic organisms is particularly mysterious, since our methods are quite inadequate to inform us from what direction the newcomer hailed. The ancestry may be directly before us, in our midst, in fact in some animal disease, but we may fail to see it because of the irreversible process that has brought the change about. With this concept in mind we can imagine many dangerous combinations frustrated, cut short, by hygiene and sanitation, numerous diseases in gestation prematurely aborted, but occasionally one successfully escaping destruction and launched into the world, at first unrecognized until a certain momentum has been acquired which brings the disease into the open.

NAPOLEON—HIS LAST ILLNESS AND POSTMORTEM ¹

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A little over a hundred years ago a man died on a lonely little island in the Atlantic, his baker's dozen of followers and himself surrounded by a garrison of three thousand men and a squadron of ships. So great was the hysteria in England, that his advent on this rock ten miles long by six broad, twelve hundred miles from the nearest land, was marked by an increase of the military population from two hundred to three thousand. It was even necessary to visit him almost daily in order to ascertain that he had not escaped. This hatred of the man could well be understood for he had defied and set at naught that most sacred of English institutions, Toryism, the English synonym of Bourbonism. The upheaval had begun with his ragged followers in Italy, reached its apogee at Tilset, and began its recrudescence through sheer exhaustion after the disastrous Russian campaign. One would think that this man so overwhelmed by opprobrium, this drinker of children's blood, given to incest, murder, robbery, and every crime in the calendar, would by the mere weight of his iniquities lie heavily in his simple unmarked grave beneath that willow tree, never to be known in his true light by the world at large; yet such was not to be a fact, for in 1840 his body was received with the deepest affection by the Nation he had raised to glory from the welter of revolution. No funeral has ever been so filled with human emotions, the ceremonies lasted from the 8th to the 15th of December and were attended by practically all of France and his magnificent sarcophagus at the home for wounded soldiers which he inaugurated, is still visited by thousands who gaze in reverence and awe at the earthly home of the man who almost struck the death blow at feudalism. It was he who said that in fifty years the

¹ Delivered before the Section of Historical and Cultural Medicine December 16th, 1927.

world would either be Cossack or free, and this prediction was fulfilled nine years ago with a stupendous sacrifice of ten million men.

I possess what I am told is his first biography in English; it was published in London in 1797 immediately after his Italian campaign. Since then he has been the subject of thousands of volumes; his last biography translated from the German has sold to nearly one hundred and fifty thousand copies. What is the secret of this seemingly inexhaustible interest in Napoleon? I, personally, believe that it lies in the fact of the appeal his life has had to the romance in all of us. Here was a man of the people so poor that he often went hungry, yet so filled with talent and the fire of genius that he attained the heights of glory and power. His military genius unfortunately clouds for many of us gifts of mind fully equal; he gave France a great code of laws, he built wonderful roads, he beautified his beloved country with remarkable gems of architecture, he established free schools for the poor, stimulated French industry by every means at his command, and even in the midst of his Russian campaign designated who was to sing during the season at the Paris opera. I have a letter from Berthier, his Chief of Staff, to Bessieres, Commander in Chief of the Imperial Guard, in which Berthier asks Bessieres to incorporate in the Guard ten chasseurs and to ask Napoleon's permission to do so. The Guard at one time numbered fifty-six thousand men and its Commander in Chief could not select ten of its members without the Emperor's approval. This is but one example in a thousand of the grasp of detail which this man forced upon himself. He raised to wealth and power upon their merits alone the great majority of his marshals and was generous to a fault, even in the face of defection, as evidenced in his treatment of some of them on his return from Elba.

Napoleon's household at St. Helena consisted of General Bertrand, wife and three children; Count Montholon, wife and two children; Count LasCases and son, and General Gourgoud. Barry E. O'Meara, Surgeon of the Beller-

ophon, had volunteered his medical services and remained as Napoleon's medical attendant until 1818, when he was banished from the island by Sir Hudson Lowe, after violent quarrels with the Governor respecting social visits to Napoleon, and his refusal to tell the Governor the purport of his conversations with the Emperor. On July 25, 1818, he made his farewell visit to Napoleon despite an order from the Governor, interdicting him from any further interview with General Bonaparte or the inhabitants at Longwood.

Dr. O'Meara states that Napoleon suffered considerably from nausea, and seemed in very poor health, yet he received no medical advice six months later, when Dr. Stokoe, Surgeon of "The Conqueror," saw him a few times. Dr. Stokoe sailed for England on January 21st, 1819, and Napoleon, despite considerable illness, received no medical advice until the arrival of Dr. Antommarchi who with the consent of the British government arrived at St. Helena on September 19th, 1819. Francesco Antommarchi was born in Corsica in 1780 and received his medical degree at Pisa. He was Professor of Anatomy at Florence in 1819 when he was selected by Cardinal Fesch, and Madame Mere, Napoleon's mother, as medical advisor to the Emperor at St. Helena. Antommarchi accepted the commission and in company with two priests and two domestics travelled slowly through Germany, arriving in London on April 19th, 1819. Here he met with all kind of difficulties and numberless delays. Offers and insinuations were thrown out in order to prevent his departure for St. Helena. It was then that he had frequent conversations with O'Meara and Stokoe in reference to Napoleon. He was, however, finally permitted to sail.

Napoleon's health became progressively worse in July, 1820, and by September the attacks of vomiting, pain in the gastric region, headache, anorexia and constipation became more frequent. During remissions in these attacks he was still able to be about, but by December 26th he could hardly make a few steps without extreme fatigue.

His condition gradually grew worse, but in February and March, 1821, he was able on two or three occasions to drive about the garden in a calèche for a few minutes. By the first of April the vomiting, gastric pain, fever, prostration and weakened heart action became much more frequent and the mental anguish and depression noticeable for many months became aggravated. At this time Dr. Archibald Arnott, Surgeon of the 20th Regiment, was called in consultation and thereafter saw Napoleon frequently with Antommarchi. On April 15th the celebrated Napoleonic will was dictated. On the night between the 24th and 25th he vomited incessantly; this continued throughout the whole day of the 25th. On the morning of the 27th Napoleon began to have gastric hemorrhages as evidenced by the "coffee ground" color of vomited material. His bowel movements at this time were of a black color. The heart action was weak and he was covered with cold perspiration. With much effort he could only trace a part of the 18th codicil to his will. On the 28th he gave his final instructions to Antommarchi as follows: "After my death I wish you to make an autopsy. Do not let any English physician other than Dr. Arnott touch my body. Preserve my heart in alcohol and deliver it to Marie Louise in Parma, give her all the details of my death. Examine well my stomach, and make a detailed report to my son. Indicate to him what remedies or mode of life he can pursue which will prevent his suffering from a similar disease. This is very important for my father died of a scirrhus of the pylorus with symptoms very much like mine."

On the 29th he became delirious, by 1 p.m. his mind was clear and Antommarchi asked his permission to apply a vesicatory to the epigastric region. He replied, "If you wish it. I do not expect the least improvement from it but I am nearing my end and I wish you to judge of my appreciation of what you have done for me by my resignation." On May 4th the end was near. He seemed in complete collapse, the pulse was intermittent and weak, singultus, cold sweat and dyspnea were present. Throughout that day a terrific tropical storm raged, rain fell in

torrents, and most of the trees in Longwood were uprooted. On the morning of the 5th many gastric hemorrhages occurred, the vomiting and singultus were continual. At 5 a.m. he was still delirious, the last articulate words being "Tête d'armée." Coma supervened, the body cold with tetanic spasms, the pulse imperceptible, the dyspnea excessive, the respiration stertorous. At eleven minutes to six respiration and heart action ceased entirely. England's prisoner had escaped. In Arnott's own words "The scene of sorrow Longwood House presented on the evening that great and extraordinary man breathed his last will never be erased from my memory."

The autopsy was held twenty and a half hours after his death by Dr. Antommarchi in the presence of Drs. Thomas Shortt, Post Medical Officer; Archibald Arnott, Surgeon, 20th Regiment; Charles Mitchell, Surgeon, H. M. S. Vigo; Francis Burton, Surgeon, 66th Regiment and Matthew Livingston, Surgeon, H. C. Service. The body appeared quite fat, on incision about an inch thick on the sternum, and one and a half inches on the abdomen. On cutting through the cartilages of the ribs, which were in a great part ossified, the thoracic cavity was exposed. There were adhesions and about three ounces of a yellowish fluid in the left pleural cavity. The upper lobe of the left lung contained several tuberculous excavations. The right lung was normal, but the right pleural cavity contained eight ounces of fluid. Both lungs were of a normal color and crepitant. The pericardium was normal, the heart of natural size but thickly covered with fat. The auricles and ventricles were empty of blood and presented no pathological changes. The aorta was normal. The abdomen was greatly distended, and on incision the peritoneum was found covered with a viscous fluid. On the anterior surface of the stomach at the lesser curvature near the pylorus was a complete perforation large enough to admit the little finger. This opening was completely closed with adhesions. On opening the stomach it was found filled with a large quantity of "coffee ground" material of an acid putrefying odor, and the internal surface of the stomach

was almost completely covered by a carcinomatous mass; only a small part of the cardiac extremity seemed free of the disease. All the adjacent lymph nodes were greatly enlarged and cancerous. The liver and spleen were engorged with blood, and there were many adhesions between the liver and stomach, but otherwise these two organs were normal. The gall-bladder was also normal. The urinary bladder contained small calculi. The right kidney was normal, the left kidney was slightly displaced. The brain was not examined.

Antommarchi sutured and washed the body, and for the last time loving hands dressed it in the familiar uniform of the Chasseurs of the Guard, the Grand Cordon of the Legion of Honor at his side, the Grand Cross of the Legion and the Iron Crown on his breast, the little three-cornered hat on his legs. It was thus that he disappeared from the view of man. His faithful little band departed from their prison on May 27th, 1821, and as a last favor from Sir Hudson Lowe, the ship assigned to them was a cattle ship supplying live stock to the Island, and it was in such a malodorous environment that they bid farewell to the man who was to remain in exile, even in death, for twenty years more.

In conclusion, the curious fact must be noted that Antommarchi found what he termed tuberculous excavations and tubercles in the left lung, yet Arnott, an eye witness at the autopsy, states that the lungs were normal. No mention of any clinical signs of tuberculosis are mentioned in the "Mémories" of the St. Helena group. All of the symptoms of his last illness clearly pointed to a gastric origin, and the autopsy definitely proved that a carcinoma with perforation was the cause of death.

ABSTRACTS OF PAPERS DELIVERED AT
SECTION MEETINGS*Section of Neurology and Psychiatry,*

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EXPERIENCES WITH ENCEPHALOGRAPHY VIA
THE LUMBAR ROUTE¹

E. D. FRIEDMAN

Historical Data. Dandy in 1918, first suggested the injection of air into the cavities of the brain for diagnostic purposes, but he abandoned the endo-lumbar for the cerebral method. Since then, however, Bingel, Forster, Wartenberg, Liberson, Carpenter, Heidrich and others have made use of the spinal method, some of them with the aid of complicated apparatus (Bingel, Wartenberg, Liberson).

Technique. Consists of the replacement of spinal fluid by air, via the endo-lumbar route.

Phenomena observed during the procedure—

- a. Pain in the occipital region, especially behind the ears, and along dorsal root zones.
- b. Frontal headache.
- c. Transitory collapse-phenomena with marked pallor and profuse perspiration.
- d. Acceleration of the pulse rate with subsequent bradycardia.
- e. At times, nausea and vomiting.

After-effects observed—

- a. Headache, which persists on an average from one to three days.
- b. Dizziness.
- c. Sensation of succussion in the head (in two instances).
- d. Meningeal syndrome with polynucleosis in the spinal fluid (on three occasions).

¹This paper is based on observations made in sixty-five cases. Most of these were studied in the neurological service of Mt. Sinai Hospital and a few of them, in the neurological department of Bellevue Hospital.

There were no fatalities that could be ascribed to the procedure even when the patient was in poor physical condition.

Encephalogram. The encephalogram should be made immediately after insuflation. At the first examination, antero-posterior and lateral views are taken. A complete series of plates is made on the following day.

The most important view is the antero-posterior, as it often gives information concerning the ventricles, when the quantity of air is not sufficient to be well visualized on the lateral plate. The interpretation of the pictures requires considerable experience. The air leaves the subarachnoid space almost entirely within twelve to twenty-four hours, unless there is retraction of the brain with external hydrocephalus. It leaves the ventricles in periods varying from three to seven days. In one instance, operated upon by Dr. Cushing, air was found in the ventricles nine days after its injection. Large quantities of air, of course, remain in the cavities of the brain for longer periods.

The normal encephalogram presents in the antero-posterior view, the characteristic butterfly-shaped anterior horns of the lateral ventricles, the upper part giving a darker and the lower part, a lighter shadow, owing to encroachment of the basal ganglia on the ventricles. In the postero-anterior view, we get a figure resembling ram's horns. In the lateral plate, if a sufficient volume of air is injected, we obtain a cast of the lateral ventricle. The tip of the inferior horn, the third ventricle and the cisternae overlap in the lateral plate. The fourth ventricle appears in the form of a triangle behind the petrous bone. Often the cisterna pontis can be visualized posterior to the pituitary fossa. The air in the cerebral subarachnoid space is usually observed in the form of fine threads coursing through the cerebrum. Lateral stereoscopic plates are often confusing because of incomplete filling of the ventricles.

On the second day, a change is usually noted in the shape of the anterior horns from the butterfly pattern to a more or less rounded form. This is probably to be ascribed to the irritating effect of the air on the choroid plexus, resulting in hypersecretion and the production of a transitory internal hydrocephalus. Frequently, one observes, that more air reaches the ventricles after several hours or on the second day. This has been attributed to the pumping effect of the cisternae.

In three of the cases, though a sufficient quantity of air had been injected, the absence of ventricular air shadows was noted. Similar observations have been made by Forster, Bingel, Kaufmann and others. There is no adequate explanation for this failure of ventricular filling, after lumbar insufflation. It may be that in such individuals, either the foramina of Magendie and Luschka are not patent or the arachnoid villi exercise a ball valve action. Similarly, Monakow believes that lumbar puncture, by diminishing the pressure in the spinal subarachnoid space, opens up potential foramina.

Nineteen cases were selected for detailed analysis.

SUMMARY OF CLINICAL OBSERVATIONS

The method described is of great value in the localization of brain tumors. It gives evidence of organic disease in doubtful cases and helps to differentiate vascular from neoplastic processes.

This method also has merit in cases of trauma for the confirmation of the diagnosis of post-traumatic epilepsy and for the differentiation of traumatic neurosis from "traumatic encephalopathy" (Schwab) and traumatic encephalitis (Osnato). In some cases of injury to the skull, one finds dilatation of the ventricular system with migration of the ventricles towards the side of the lesion (Ventrikel-Wanderung). The encephalogram is also of importance in differentiating neoplastic lesions from hysteria or encephalitis.

In cases of brain tumor, one encounters a shifting of the ventricular system to the opposite side, a change in the vertical axis of the third ventricle, dilatation of the contralateral ventricle and general distortion of the normal butterfly figure. There may be encroachment on the ventricle from above or from below. The posterior horn may be encroached upon by tumors in the posterior fossa although in the experience of the writer, it is difficult to draw any diagnostic inferences from simple distortion or inadequate filling of the posterior horns.

Occasionally, in brain tumors the homolateral ventricle is distended, but in such instances there is a shifting of the third ventricle to the opposite side. In cases of internal hydrocephalus, one often finds a characteristic extension of the lateral ventricle posteriorly, in the shape of a "glove finger."

If one finds normal and symmetrical ventricles, the existence of a cerebral tumor is improbable and if this ventricular picture remains unaltered for months, the presence of a new growth may be excluded. Often neoplasms, which give few clinical signs, for example, right frontal and temporo-sphenoidal lesions, yield striking radiographic findings.

This method was employed in one case of chronic brain abscess without harm. In a number of instances, the diagnosis of brain tumor was abandoned because of the demonstration of normal ventricles. The encephalogram may permit us to make a diagnosis of cerebral neoplasm early in its course and before the advent of fundus changes, by demonstrating changes in the ventricular system, such as we have described.

The condition which we have designated "Retracted Brain," includes instances of late epilepsy with symptoms and signs suggestive of focal cerebral disease. Even though there is no evidence of general athero-sclerosis in these cases, we believe that they present focal lesions of vascular genesis with consecutive atrophy of the brain.

Most of the epileptics revealed internal or external hydrocephalus or both. The external hydrocephalus was manifested by either extensive accumulations of air at the vertex, at the frontal or at the occipital pole or by larger collections of air in the sulci. The case of degenerative chorea and the one of paresis showed hydrocephalus *ex vacuo*. In the instance of hemiplegia, dating back to early life, the characteristic ventricular migration toward the side of the lesion was noted. The case of subdural cyst exhibited an absence of air in the left ventricle with a crescentic distortion of the right ventricle. In the microcephalic idiot, we were able to demonstrate, with so small a quantity as 15 c.c. of air, a definite internal but no external hydrocephalus. The procedure is usually very well borne by paretics and epileptics.

Advantages of Endo-Lumbar over Trephine Insufflation—

1. Lumbar insufflation is not a surgical procedure; it can, therefore, be carried out by the neurologist in the hospital ward.
2. With the Dandy method, it is sometimes difficult to find the ventricles, particularly if they are dislocated.
3. The diagnostician does not have to traverse the brain and is, therefore, in no danger of striking a vessel and inducing bleeding.
4. By means of lumbar insufflation, one can fill the cerebral subarachnoid space and the cisternae. A better insight is thus obtained into the brain structures.
5. All the air injected finds its way into the cerebral spaces, whereas with the Dandy method, the air often escapes beside the needle.
6. There is practically no mortality from this method, and it is, therefore, a safe procedure.

In favor of Dandy's method, the following points may be enumerated:

1. Fewer subjective complaints on the part of the patient and absence of the signs of meningeal irritation.

2. Less air required. But in a way, this is a disadvantage, because one cannot fill all the cerebral spaces.

In cases of obstructive hydrocephalus, the trephine method is the better. One is not justified in making a diagnosis of obstructive disease if the air fails to reach the ventricles after lumbar insufflation. In such cases, air injected through a trephine opening, may remain in the ventricles for weeks, indicating the lack of absorptive power of the ventricular walls.

Conclusions. Endo-lumbar insufflation of air for diagnostic purposes is a safe and helpful procedure. It elucidates many phases of cerebral diagnosis. It is less likely to give rise to serious complications than the injection of air through a trephine orifice. For the confirmation of the diagnosis of tumor of the posterior fossa, however, and for the demonstration of obstructive internal hydrocephalus, the Dandy procedure still remains the preferable method.

Section of Medicine, February 21, 1928

THE DOSAGE AND CLINICAL USE OF INTRAVENOUS DIGITALIS THERAPY

HAROLD E. B. PARDEE

There are two methods which have been commonly used for testing the activity of digitalis upon the human heart. The first of these involves the giving of digitalis in large or medium sized doses, until a definite toxic effect is produced. The second involves the giving of the drug to slow the heart rate of patients who have rapid hearts due to auricular fibrillation. In 1923 I was able to report upon a method of testing the activity of digitalis upon the human subject which did not demand the giving of toxic doses. This method depended upon the fact that digitalis affects the T wave of the electrocardiogram in rather small doses. The object of this test was to determine the smallest amount of a digitalis preparation which would cause

a measurable decrease in the height of the T wave. This amount of digitalis was called a T wave unit, and it was determined to be between $1/8$ and $1/10$ of the full therapeutic dose of the preparation.

In 1925 the commonly used intravenous preparations of digitalis were tested for their ability to affect the T wave of the electrocardiogram, and it was found that they had a strength far less than had been suggested by the manufacturers. The T wave unit of these preparations given intravenously was about equal in volume to the T wave unit of the tincture of digitalis given by mouth. Assuming that the full therapeutic dose of these preparations was 8 times the T wave unit, we have proceeded to treat patients with rapid heart rate due to auricular fibrillation, by the intravenous administration of $1/2$ of the estimated therapeutic dose. This dose was 4 times the T wave unit and practically 1 minim per pound of body weight of the patient.

The patients had received no digitalis for the previous three weeks. They were put to bed and kept quiet and several counts of the heart made with a stethoscope to determine the control heart rate before administration. They were then given 1 minim intravenously of the various digitalis preparations, and the heart rate counted by stethoscope at intervals thereafter.

Tables were shown to illustrate the slowing of the heart which was produced by intravenous administration of Digitan solution, Digalen solution and Digifolin solution in the above doses. It was observed that there was a marked drop in the heart rate during the first fifteen to thirty minutes, and a further slowing during the next hour and a half or two hours. This effect was observed after each of the preparations, and there was no material difference from one to another. Certain patients, altho not evidently different clinically, showed less response to the digitalis. These patients are evidently more resistant to the effect of digitalis for it is not possible that variable absorption of the drug could have any influence here.

The effect upon the T wave was also studied by Dr. George Friedman, and will be reported upon later. The preliminary work seems to show that the T wave is, as a rule, affected somewhat later than the heart rate.

The results with these digitalis solutions are practically identical with those obtained by Wyckoff and Goldring who used Ouabain intravenously.

The prompt effects after intravenous administration are in contrast with the time of onset of digitalis effects after oral and rectal administration of analogous doses of tincture of digitalis. After oral administration the initial slowing of the heart rate of patients with auricular fibrillation appears in from two to five hours, the maximum slowing in from seven to twenty-four hours. The effect upon the T wave occurs in from two to twenty-four hours after administration. There is evidently an advantage in favor of intravenous administration over the other methods in that the onset of action is more prompt and the maximum effect is produced in about one-third of the time.

There is no advantage in giving digitalis preparations intravenously as compared with the oral or rectal route, unless the patient cannot retain digitalis by mouth or by rectum, or unless the patient is in extreme need so that the effect must be produced in two or three hours. When intravenous administration is decided upon, I would suggest giving, as an initial dose to a patient who has not taken any digitalis recently, 1 minim per pound of body weight. Allow two hours for this to produce an effect, and if another dose is necessary, give $\frac{1}{4}$ of the first dose. This $\frac{1}{4}$ minim per pound of body weight dose may then be repeated, if further stimulation seems necessary, until four of these doses have been given at two hour intervals. The greatest caution must be observed to avoid giving further doses after toxic digitalis effects have appeared. Arrhythmia and tachycardia are sometimes due to digitalis intoxication and may be wrongly attributed to an aggravation of the cardiac condition.

If the patient shows definite improvement after the first dose, no further intravenous doses will be necessary, for the effect may be continued by oral administration. I prefer these digitalis preparations to Ouabain because of the wider margin between the therapeutic and the toxic doses of digitalis.

When a patient, who has been receiving digitalis recently is found to be in a state demanding intravenous therapy, the problem of dosage is more difficult. We must proceed more slowly in order to avoid giving a toxic dose. It seems proper to give the dose of $\frac{1}{4}$ minim per pound of body weight and to repeat this at intervals of thirty minutes to an hour, until four doses have been given. After this the intervals should be lengthened to two hours. Here again careful observation for toxic heart rhythm should be made before repetition of the dose.

Doses of this sort have been used repeatedly during the last year or two, and there has not come to my attention any evidence of harmful effects. As to the use of smaller doses than those recommended, in patients without previous medication, it has been found that doses of 15 to 30 minims produce a very slight, scarcely perceptible effect upon the heart rate of patients with auricular fibrillation, and usually no effect or only the slightest upon the T wave of the electrocardiogram. As a therapeutic procedure, I feel that such doses are quite inadequate for the treatment of an emergency. In previously treated cases, a dose of 30 minims may produce a definite, though moderate, slowing of the rate, and thus have some therapeutic effect. This dose may be close to the $\frac{1}{4}$ minim per pound of body weight dose recommended above for the continuation of previously treated patients, and may be repeated as recommended.

Section of Obstetrics and Gynecology,

February 28, 1928

SPONTANEOUS RUPTURE OF PYOSALPINX INTO
THE URINARY BLADDER

S. DI PALMA and M. M. STARK

The authors report a case of pyosalpinx which ruptured into the urinary bladder a few days after the patient's admission into the hospital.

The patient was cystoscoped prior to and after the rupture and later was operated upon and site of attachment of the pus tube to the urinary bladder found. While no communication was present at this time, a marked adherence of the pus sac to the viscus existed which necessitated separation and Lambertizing of the bladder wall.

The literature was searched carefully for cases of this type and 34 including the authors' case were found. Most of these cases have been reported in the foreign literature.

As the opening in the case reported could not be visualized by cystoscopy, 20 per cent. sodium iodide was injected through a needle which had been thrust into the pus cavity through the cul-de-sac, and a skiagram taken which showed pus sac and the laking of some of the fluid in the bladder.

The fluid from the bladder was also examined and immediately after the injection through the cul-de-sac the presence of iodide was detected.

The article deals with the cause, pathology and treatment of this condition.

The following are the conclusions:

Spontaneous rupture of pyosalpinx into the urinary bladder is extremely rare.

The symptoms are clinically characteristic; following sharp pelvic or suprapubic pains, there appears in the

urine large quantities of frank oftentimes foul smelling pus, after which there is a drop in temperature, a relief of urinary and vesical symptoms and a decided improvement in the general condition of the patient.

Cystography and cystoscopy add convincing data to an otherwise obvious clinical diagnosis.

A patent ostium is not always visible in the bladder wall; on the other hand, an isolated area of edema or redness with a crater-like central depression, together with pelvic pathology, is presumptive evidence of impending ulceration of rupture. The site of the rupture is usually on the lateral wall, just beyond and to one side of the ureteral opening. An absolute diagnosis is reached by X-ray after filling the pus cavity with roentgen-ray opaque fluid, transvesically or by the authors' method.

A rupture may heal spontaneously, as may also the original abscess; it may recur several times, as is the case in those patients who present themselves in poor general condition, the result of chronic invalidism.

Operation by laparotomy to remove all disease is the proper method of treatment; this is best undertaken when the temperature is levelled and the white cell count less than 10,000.

The fistulous communication between the pus sac and the bladder cannot always be found at the time of operation. When it is found, however, it is given the necessary surgical attention. Drainage by indwelling catheter and by gauze through the vaginal vault is recommended.

A SIMPLIFIED METHOD OF TESTING TUBAL PATENCY

I. SETH HIRSCH and N. SCHNAYERSON

The presentation has a two-fold object: First, to suggest certain physiological considerations bearing on the method by which material entering the cervical canal is carried

to the ovarian neighborhood; and secondly, to present for your consideration a simple test which when elaborated may permit us to determine graphically the tubal patency and give at the same time an idea of the topographical conditions within the pelvis.

Bond placed carmine particles in the vagina of a rabbit and recovered them in the peritoneal cavity. The so-called regurgitation of tubal and uterine epithelium through the fallopian tubes, into the free pelvic cavity has been proven by Sampson. He was able to demonstrate these epithelial cells and bits of free lying epithelium and stroma identical with that found in the uterus in blood collected from the fimbriated ends of the tubes during laparotomy. In eight out of fourteen cases in which the laparotomy had been preceded by a dilation and curettage, smears taken from the tubal extremity revealed epithelial cells. He has also found carcinoma cells in the tubal lumen following diagnostic curettage for carcinoma of the body of the uterus.

Davis and Cron have reported a case which seems to indicate quite definitely that an increase in intra-uterine pressure may force bits of endometrium backward through the tube, and Allen has recently corroborated by clinical and experimental evidence the fact that any operative procedure which increases intra-uterine pressure may displace endometrium into the peritoneal cavity.

Suspecting that the element of pressure was not an important factor, we repeated the experiment of Williams and Reynolds of attempting to instil an emulsion of contrast salt into the uterine cavity. It was, however, found impossible to avoid forcing this mixture through the uterus into the tubes, no matter how carefully the injection was made. These injections also proved definitely that a few drops of properly prepared mixture were sufficient to outline the uterine cavity and the tubes. In order, therefore, to reduce the factor of intra-uterine pressure to the minimal, the contrast salt was put into the form of a small

suppository of a shape and size which permitted its insertion into the cervical canal.

We have been able to prove that upon the insertion of such a suppository within the cervicall canal, the body temperature reduces the suppository to an emulsion of contrast salt, which is then carried rapidly out of the uterus, through the tubes, into the peritoneal cavity and that in this transmission increased intra-urine pressure plays no part. The transmission is probably effected through the agency of muscular contraction, tonicuterine and peristaltic tubal, although the possibility of a suction mechanism has been suggested. This brings up the question as to whether the motility inherent in the spermatozoön plays an important part in its reaching the ovarian neighborhood. The motile power may functionate in bringing it into the cervical canal. From this point, however, its passage into the ovarian region, if it reaches this region, is probably made through the same agencies and with the same rapidity as the fine particles of contrast salt in our experiment. It also answers the doubts of Novak, who questioned whether a piece of endometrial tissue could be regurgitated through the minute, often tortuous interstitial portion of the tube and whether it could pass the pelvic cavity against the ciliated current of the tubal epithelium. It also raises the question as to just what the function of the ciliated epithelium is.

On the basis of this experiment, it seemed justifiable to infer that this method might be utilized as a test for tubal patency. Thus, if at the end of a certain number of hours, the contrast salt could be seen in the peritoneal cavity, the inference of tubal patency would be justified. By CO₂ tubal insufflation and lipiodol injections, a check up of cases on which such a test was applied seems to prove that this hypothesis is correct.

Section of Pediatrics, March 8, 1928

THE SEX FACTOR IN INFANT MORTALITY¹

(ABSTRACT)

HARRY BAKWIN

Sex is an important factor in determining the outcome of disease during infancy. During the ten year period from 1915 to 1924 inclusive, there were from 130 to 134 deaths in white male infants under one year from all causes to 100 deaths in white female infants under one year, in the United States Birth Registration Area. Since the proportion of males to females at birth during that period was approximately 106 to 100, it is apparent that the death rate in boys is considerably higher than that of girls during the first year of life. This hypersusceptibility on the part of the male is evident before birth. Schultz found marked variations in the sex ratio of stillbirths from month to month. During the third and fourth months of gestation the ratio is high (121—117.5). In the fifth to the seventh months it declines markedly (101.9), rising again in the eighth to the tenth months to a much higher figure than any previous period (165 males to 100 females).

Variations in the Mortality Sex Ratio During the First Year of Life. At birth the sex ratio is high (140). It rises markedly on the third day (to 147) after which it falls gradually until the third week. It then rises again, reaching another peak in the second month of life after which it declines gradually.

The Mortality Sex Ratio and the Death Rate. It has been found that as the infant mortality rate has fallen

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the sex ratio rises. In such countries as Sweden, and England and Wales where mortality records have been kept for a great many years, the fall in the death rate has been accompanied by a rise in the sex ratio. Most other countries also show this increase in the sex ratio as the infant death rate has declined. Thus in the decade 1841-1850 the infant death rate for England and Wales was 153 and the mortality sex ratio 122. Coincident with the fall in the death rate starting after 1900, the ratio began to rise so that in 1926 with a death rate of 70 the sex ratio was 130. The ratio has risen not only for infants under one year, but for all age subdivisions under one year and for children during the first five years of life.

ENVIRONMENTAL FACTORS INFLUENCING THE MORTALITY SEX RATIO

Regional Differences in the Mortality Sex Ratio. For the same death rate the mortality sex ratio in different countries varies. The ratio is higher in England, Wales and Scotland and low in Italy, Jamaica, Japan and Spain.

The Mortality Sex Ratio for Urban and Rural Communities. The infant mortality rates are regularly higher in the U. S. A. for urban than for rural communities. Though the death rate is higher, the sex ratio, contrary to what one might expect, is also higher. Urban life is apparently not only less favorable for both sexes but is particularly unfavorable for the male.

Seasonal Variations in the Mortality Sex Ratio. The mortality sex ratio for infants under one year of age is high during the winter and low during the summer months. This is true for diseases with a high winter death rate, *e.g.*, pneumonia, as well as for those with a high summer death rate, *e.g.*, diarrheal diseases. For infants during the first month of life the curve is reversed, the mortality sex ratio being higher during the summer months,

but after the second month of life the mortality sex ratio for infants under one year is regularly high during the winter and low during the summer.

It is suggested that the climatic, regional and seasonal variations in the mortality sex ratio during infancy are dependent on the different quantities of sunlight which reach the infant. England, Wales and Scotland are notoriously poor in sunlight, while Italy, Jamaica, Japan and Spain are countries which abound in sunlight and which have populations that live to a large extent outdoors. It seems reasonable to suppose that infants in rural communities get more sunlight than do those in the city where life is to a much larger extent confined to indoor living and where sunlight, particularly the ultraviolet portion, is absorbed by dust and smoke. That the quantity of sunlight reaching the infant during the summer months is greater than during the winter months is obvious.

Some of the harmful factors of the absence of sunlight for infants are now well known. Ultraviolet radiant energy or a substitute is of the greatest importance in regulating calcium metabolism. It is necessary for the proper deposition of calcium in bone and for the maintenance of a normal calcium concentration in the circulating fluids.

It has been found that the calcium regulatory mechanism in males is much less stable than in females. In a series of 168 patients infantile tetany occurred more than twice as often in boys as in girls. Whether or not rickets is more common in boys than in girls has not yet been determined.

It seems reasonable to assume that the season of the year at which the sex ratio is lowest represents that regional climatic environment most favorable for the male. If the mortality sex ratio during the entire year could be reduced to its lowest seasonal level many deaths would be prevented. During the five year period studied for the preparation of the chart on seasonal variations (1918-1922) there were 645,903 deaths from all causes in infants in the

U. S. Birth Registration Area with a sex ratio of 133.8. If this ratio had been 126.5 instead, the lowest point reached by the ratio for that period, the lives of approximately 21,000 males would have been saved. This calculation is only for the birth registration area of the United States which constituted 53 per cent. of the population in 1918 and 72 per cent. in 1922.

It is therefore of more than academic interest to know what the environmental factor or factors are which react so unfavorably on male infants. If the hypothesis suggested above proves to be true, namely that variations in the amounts of sunlight through the stabilizing effect on the calcium regulatory mechanism determine the regional and seasonal differences in the mortality sex ratio, then a method for the reduction of the mortality sex ratio by means of artificial sunlight or a substitute is strongly indicated.

CONGENITAL INTESTINAL OBSTRUCTION

RICHARD W. BOLLING

The diagnosis in the majority of cases of congenital intestinal obstruction may be made promptly and certainly, and in a considerable proportion of these cases the anatomical conditions afford a very promising field for surgical endeavor.

This paper treats of stenosis and atresia of the intestinal tract and volvulus secondary to abnormal intestinal rotation, excluding congenital stenosis of the pylorus and malformation of the anus and rectum, as well as those cases of chronic intestinal obstruction due to anomalies in rotation manifested later in infancy and early childhood. The author's personal experience comprises fourteen cases, one of abnormal rotation with volvulus and thirteen of intestinal occlusion, extrinsic or intrinsic. In seven of these cases the anatomical conditions were such

as to make them peculiarly amenable to surgical treatment. In one the condition was not recognized during life. Six were operated on and four survived.

Congenital occlusion of the intestine is most often single and usually complete. The duodenum is the favorite site except in the event of multiple occlusions when the jejunum is most frequently involved. The colon is least frequently affected. When the occlusion is incomplete there may be a simple narrowing or a perforated diaphragm. When complete there may be absence of a segment, a portion of the bowel may be replaced by a fibrous cord or the lumen may be occluded by a septum.

The bowel above the obstruction is dilated, often extremely so and the walls are hypertrophied. If the obstruction is above the papilla of Vater there will usually be an absence of bile but as was shown by Cordes, bile may be present both above and below the obstruction. Below the obstruction the bowel is wormlike in appearance, usually owing to want of distention rather than to want of development.

Associated malformations may occur but are not common. The most frequent is anorectal imperforation.

No one theory of the causation of these defects can explain all cases. In the order of frequency, (1) developmental defects, (2) fetal accidents (3) and fetal diseases may be mentioned.

The congenital type of volvulus is the result of congenital deficiency in the attachment of the mesentery of the small intestine and lack of fixation of the ascending colon. Violent peristalsis or sudden effort may cause abnormal rotation, partial and recoverable, producing only transient symptoms, or complete and, if unrelieved, fatal.

Symptoms. Complete atresia is incompatible with life and causes symptoms shortly after birth. When the obstruction is incomplete, particularly when it is situated in the duodenum, the length of life is sometimes surprising.

Vomiting, beginning soon after birth, usually as soon as feeding is begun, is the leading symptom. At first the vomiting may occur only when food is taken but later is persistent and independent of feeding. In the majority of cases the vomitus is bile stained. In the cast of stenosis vomiting may be greatly delayed.

The character of the stools depends upon the situation of the obstruction. If above the opening of the bile duct typical meconium is passed in varying amounts. If below the papilla the stools are very scanty and usually consist of small amounts of greyish mucus. When the obstruction is incomplete the stools are at first typical meconium, later changed by the small amount of milk which passes the stenosis.

Distention is present in most cases and the degree is determined by the situation of the obstruction. In cases of duodenal atresia distention is limited to the upper abdomen. Peristaltic waves may be noted passing from left to right. Distention of the whole abdomen is noted when the obstruction is lower in the intestine. In such cases irregular peristaltic waves may be seen and the dilated intestinal coils palpated.

Progressive loss of weight and dehydration are evident. In any case of persistent vomiting in a newborn infant roentgenographic examination is imperative and will usually give definite information as to the presence and site of the obstruction. An opaque meal or enema may be given with safety in the earliest infancy.

In the case of volvulus imposed on abnormal rotation the infant remains apparently normal for a varying period after birth. Meconium is passed and subsequently milk stools. With the onset of volvulus the symptoms are those of duodenal obstruction.

Diagnosis. To be differentiated are:

1. Malformation of the anus and rectum.
2. Internal hernia with strangulation.
3. Pyloric stenosis.

Imperforate anus may be complicated by atresia of the intestine. If, in a case of imperforate anus the intestinal contents are grey and pasty it is reasonable to assume the presence of obliteration of the intestinal lumen higher up and below the bile duct. An obstruction of the rectum may usually be demonstrated by digital examination.

The strangulation of an internal hernia would probably be very difficult to diagnose unless the hernia were diaphragmatic in which event the thorax would show characteristic signs.

Pyloric stenosis rarely gives rise to symptoms at so early an age and is excluded by the roentgenogram and by the absence of tumor.

Treatment. In atresia or stenosis, entero-anastomosis is the operation of choice. When the duodenum is involved, duodeno-jejunostomy is preferred to gastro-enterostomy. Of the four cases operated upon by the author for intrinsic obstruction of the duodenum there were three instances of atresia. In one of these a gastro-enterostomy was done and the patient died on the twenty-third day as a result of wound infection due to an infected umbilicus. In the second case an anterior duodeno-jejunostomy was done and the patient is now two and a half years old. A posterior duodeno-jejunostomy was performed in a similar case recently discharged. In the fourth case, one of stenosis of the duodenum, a posterior duodeno-jejunostomy was carried out and the patient is now seventeen months old.

In the case of volvulus the intestines should be untwisted and restored to as normal relations as possible. In the one case of this condition observed by the author, the volvulus recurred and a second operation was necessary twenty days after the first. This child is now four years old. It is probably desirable to fix the cecum by suture in as nearly normal a situation as possible to prevent recurrence. In the obstructions lower down entero-anastomosis is indicated, possibly with the addition of a temporary enterostomy.

A POSSIBLE CAUSAL FACTOR OF FOOD ALLERGY IN CERTAIN INFANTS

BRET RATNER

An explanation has been sought for allergic manifestations—vomiting, urticaria, etc., which occur when certain children come in contact with a particular food for the first time, eczema, asthma, etc., following upon continued exposure.

The theory is voiced that these infants have been actively sensitized in utero because of the mother's over-indulgence in certain protein foods during pregnancy.

Cases are presented to exemplify this type of allergic phenomenon, having been chosen from a group gathered over a period of seven years.

Experimental evidence is presented to show that:

1. In human beings and guinea-pigs the placenta is permeable.
2. Proteins may pass from the maternal to the fetal circulation through the placenta in the human being and in the guinea-pig.
3. The human fetus and the guinea-pig fetus can be actively sensitized in utero.
4. Proteins can enter the circulation in an undigested state from the maternal intestinal tract and thereby gain entrance into the fetal circulation.

The conclusion drawn is that under certain conditions an infant having a predisposition for allergy may become actively sensitized in utero, because of the mother's over-indulgence in certain protein foods during her ante-partum period, and after birth, when coming in contact with this food for the first time, her child will manifest some form of allergic phenomenon.

If this be true, it is hoped that the development of such cases of protein hypersensitiveness may be prevented by the careful regulation of the ante-partum diet.

Section of Otology, March 9, 1928

PRIMARY JUGULAR BULB THROMBOSIS *

JACOB L. MAYBAUM and IRVING B. GOLDBMAN

Because of an apparently unimportant, vague or indefinite aural history in cases of primary jugular bulb thrombosis, the condition is more likely to be seen at the onset by the internist or pediatricist rather than the otologist. For similar reasons, these cases are usually seen in general, less frequently in special, hospitals. The importance of early diagnosis becomes evident when we realize that in order to obtain a favorable outcome of this serious illness, prompt surgical interference is imperative.

The subject of primary jugular bulb thrombosis was first brought to the attention of the American medical profession by McKernon in 1904. At that time he referred to the relationship which exists between an apparently unexplained septic temperature and an acute otitis media. The diagnosis, difficult at times even now, was all the more so at the time of McKernon's report, as his work antedated the very important blood culture studies of Libman in 1906. Recent differential blood culture investigations of Ottenberg, to which more extended reference will be made later, have contributed still further to the early recognition of this condition.

The term primary bulb thrombosis is employed to designate the formation of an infected thrombus in the dome of the jugular bulb, the lateral and sigmoid sinus not being affected by the thrombosis in the initial stages of the lesion. It occurs usually in young children. The bony partition separating the middle ear cavity from the jugular bulb is often extremely thin. An unusually high dome or roof of the bulb, may encroach upon the floor of the middle ear. An added factor is the frequent presence of dehiscences in the floor of the tympanic cavity and as a result there may be direct contact between the floor of the middle ear and the dome of the bulb. The mastoid in

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young children not infrequently shows a congenital absence of cells. Under conditions such as these, it can be readily seen how an active purulent middle ear infection may primarily invade the blood current, attacking the bulb, the pathway of infection being through the small communicating veins and lymphatics or by a destructive process through the bone. An infection in the tympanic cavity may first involve the carotid plexus of veins situated along the anterior tympanic wall; from there the infection may pass directly into the bulb and thus produce a primary bulb thrombosis. It is important to remember that the jugular bulb may become directly infected as a result of an acute inflammatory process in the middle ear, without evidence at any time of middle ear discharge.

A study of the cases reported in this paper will serve the purpose of elucidating the clinical course pursued by this disease. The onset may be insidious, the aural history being so indefinite as to escape the attention of those who see these patients first. In one instance, case A. H., there was a history two months previous to admission, of fleeting pain in the right ear of twenty-four hours duration; at no time was there any middle ear discharge. A diagnosis of primary bulb thrombosis was finally made and the relationship between the prolonged sepsis and a negligible ear history was established and confirmed at operation. In the majority of instances, aural examination discloses evidence of a subacute otitis media purulenta or of a beginning middle ear resolution without mastoid involvement. The drums are flat, thickened and the short process or hammer handle is evident. The hearing may be only moderately impaired.

Aside from a history of an acute otitis media, the only symptom of importance is a fluctuating temperature between 99° F. or 100° F. and 104° F. Not infrequently the temperature runs a low course, 100° F. or 101° F., for a few days, followed by a rapid rise and fall. Most of our cases have come to us with such a history of two or three weeks duration. As a rule these patients do not have

a distinct chill, they may, however, have chilly sensations. If the rapid fluctuations in temperature continue for a few days, pallor becomes quite evident, and the tongue appears white and dry. The following symptoms associated with a more or less definite aural history arouses one's suspicion of the presence of a bulb thrombosis even before the report of a positive blood culture: Pallor, dry tongue, an enlarged spleen, enlarged and tender lymph glands at the angle of the jaw and early changes in the ocular fundi. The blood count shows a leucocytosis, 12,000 to 15,000 and a highly polynucleosis, 75 per cent. to 85 per cent. Daily estimation of hemoglobin percentage and red blood cell count points to a progressive secondary anemia. The diagnosis can be made, in the presence of a sepsis unaccounted for by any other demonstrable lesion, by a history of an acute middle ear suppuration and a positive blood culture.

Valuable aid in the diagnosis and localization of sinus thrombosis has resulted from the recent blood culture studies of Ottenberg. Blood is taken simultaneously from both jugular veins, cultured and the colonies counted. In a suspected case of sinus thrombosis, a preponderance of bacteria may be found in the blood obtained from the vein on the normal side as compared with that from the diseased side. The procedure was done by Ottenberg in three of our cases of suspected primary bulb thrombosis with striking findings. These findings apparently point first, to the presence of an occluding thrombus; secondly, in bilateral involvement, the disproportionate bacterial growth is strongly suggestive, from the cases thus far studied, of an involvement of the sinus on that side from which the lesser number of colonies is obtained. This work further indicates the extreme importance of careful surgical procedure to arrest systemic invasion, by thoroughly dealing with the torcular end of the diseased sinus, the jugular vein having been previously ligated.

From Ottenberg's studies it appears that in the presence of an occluding thrombus involving the jugular bulb

and lateral sinus, the general systemic invasion is produced, in large measure, as a result of the free circulation of blood at the torcular end of the thrombus; the infection is carried by way of the sinuses on the normal side; the circulation at the upper end of the jugular vein and bulb on the diseased side is far less active.

As to the indications for a jugular bulb operation and the surgical approach to the bulb; in a majority of instances operative procedures upon the bulb are unnecessary. If sepsis continues despite thorough surgical measures directed to the torcular end of the sinus and evidence points to suppuration in the jugular bulb, our indications are to deal with the focus in the bulb. The question of the presence of suppuration in the bulb is determined by our ability to cause puss to well up into the mastoid cavity from the bulb, upon pressure over the tender swelling which is present at the angle of the jaw.

Blood transfusion is not necessarily indicated in all cases of sepsis of otitic origin. These patients should not be subjected to the added danger of transfusion, even though the possibility of an untoward result might be remote, when the clinical course and physical condition following well directed surgical management give every indication of being satisfactory.

Blood transfusion may be useful pre-operatively. Patients in serious condition as a result of sepsis of comparative long standing withstand operations better if given a transfusion pre-operatively. A blood transfusion is usually done immediately after operation. As to subsequent transfusions, in recent years we have recourse to these only if the general condition, especially as indicated by a decreasing hemoglobin and red blood cell count, warrant it. We do not favor the indiscriminate use of blood transfusions in these cases.

The following is a summary of the nine cases of primary jugular bulb thrombosis reported from the service of Dr. I. Friesner at Mount Sinai Hospital.

SUMMARY OF CASES

<i>Aural history:</i>	<i>Cases</i>
Bilateral middle ear suppuration.....	1
Acute purulent otitis media.....	7
Acute otitis media (no otorrhea).....	1
Chronic purulent otitis media, central perforation, mild acute exacerbation	1
Type: Mild: Recent acute otitis media or resolving	
History of repeated attacks of acute otitis media.....	7

<i>General symptoms:</i>	<i>Cases</i>	<i>Ocular fundi:</i>	<i>Cases</i>
Chills	4	Optic neuritis	3
Septic temperature	9	Early to advancing	
Headache	3	Papillo-edema	2
Vomiting	2		
Spleen enlarged	3		
Liver enlarged	3		
Cervical glands enlarged and tender.....	4		
Cutaneous (maculo-papular and pustular) ..	5		
<i>Operative findings:</i>			
Acellular (sclerosed)	8		
Mastoid cells (not involved).....	1		
Sinus plate: intact	9		
Sinus wall: diseased	9		
Sinus contents: purulent obturating			
thrombus	7		
fluid pus	1		
thrombus not demonstrable.....	1		
Bleeding			
bulb: absent	8		
torcular:			
Yes	4		
No.	2	(Free bleeding from	
Doubtful	3	superior petrosal.)	

*Post-operative Course**Metastases and complications:*

Five cases: {	Temporo-sphenoidal abscess	1
	Pulmonary: Bilateral embolic process.....	1
	Joints and soft parts	3
	Sympathetic meningitis	1

Fundi: post-operative: Four—negative
 Five—increased changes and then recession to
 normal.

Outcome: Eight cases recovered. One deceased.

BLOOD CULTURES

Before and after operation: Eight of the nine cases had a positive blood culture, seven—hemolytic streptococcus, one—nonhemolytic streptococcus. One case, negative before operation, was positive after operation. Two cases were negative after operation and remained so. Seven cases were positive for a time after operation. In one case (J. S.) blood cultures were persistently positive for five weeks (Recovered).

Differential blood cultures were done in two of these cases. The first of these (A. S.) had a bilateral otitis media; the problem of which side to operate upon, therefore, confronted us. These cases had a marked preponderance of bacterial growth in the blood cultured from the internal jugular vein on the sound side as compared with the blood taken from the vein on the diseased side. Similar findings were present in an additional case seen by Ottenberg in another hospital. One of our cases (not a primary bulb) at Mount Sinai Hospital, had a preponderance of bacterial growth in the blood obtained from the jugular vein on the *diseased* side.

Below is appended, in outline form, Ottenberg's differential blood culture findings in a number of cases. The first three were primary bulb cases (two reported in this paper). The fourth and fifth were cases of sinus thrombosis secondary to mastoiditis. The sixth was a case of bacterial endocarditis:

CONCLUSIONS

1. A mild middle ear infection in young children, associated with a septic temperature otherwise unaccounted for, suggests the possibility of a Primary Jugular Bulb Thrombosis.
2. For a favorable outcome, early diagnosis and prompt surgical interference, properly directed, is imperative.
3. Blood culture studies of Libman and more recently of Ottenberg materially aid in the diagnosis.

A. Cases of Occluding Sinus Thrombosis

<i>Name</i>	<i>Findings</i>	<i>Side</i>	<i>Occlusion</i>	<i>Organism</i>	<i>Colonies per c.c.</i>		
					<i>Rt. Int. Jug</i>	<i>Lt.</i>	<i>periph</i>
(1) Stern	Sinus thrombosis	L		Streptococcus	278	9	
(2) E. M.	"	R		Hemolyticus	15	67	
(3) Nuna	"	L			25	8	
(4) Grant	"	L			122	7	6
"					255		22
"			(Post-operative)		356		78

B. Case of Mural Thrombosis of Sinus

(5) Sontag	Sinus thrombosis	I,	O	Streptococcus non-hemolytic
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C. Other Condition

(6) Sugarman	Bacterial endocarditis	—	Streptococcus viridans	14	10	16
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4. Occlusion of the main channels of systemic invasion, especially the torcular end of the diseased sinus, as suggested by Ottenberg's differential blood cultures studies, is of prime importance.

5. A jugular bulb operation should be performed only if there is a continuance of bacteriemia and symptoms, general and local, after the main channels have been obliterated. Extensive jugular bulb operations are seldom indicated.

Section of Neurology and Psychiatry, March 13, 1928

A CASE REPORT OF TORULA MENINGITIS

S. BERNARD WORTIS and HENRY B. WIGHTMAN

A. H., male aged 20, single, American, chauffeur by occupation, was admitted to Bellevue Hospital on August 26, 1927, complaining of pain in the eyes and headache of three months' duration.

History

Past. Essentially negative.

Family. Father died of tuberculosis at the age of 27.

Mother, two sisters and one brother living and well.

Present Illness

(Obtained from the patient and the patient's mother).

Three and one-half months before admission the patient noticed a slight haziness of vision and headaches. The onset was insidious and the headaches were not severe, nor were they present at all times. They became of increasing intensity and were associated with a definite drowsiness and mental confusion. Three weeks before admission the patient vomited when the headaches were most severe.

The patient consulted an oculist who prescribed glasses, which gave him no relief. He was treated in the Out-Pa-

tient Department for a "head cold," and was finally admitted to the Nose and Throat service with the diagnosis of sinusitis.

Physical examination at the time of admission revealed a fairly well developed and well nourished young man lying quietly in bed, apparently in pain, but not acutely ill.

Head. Tenderness over the frontal sinuses on percussion.

Eyes. Pupils normal.

Fundo. Marked papilledema with exudation and hemorrhages with obliteration of both disks and distention of the veins.

Nose. Bilateral hypertrophy of the turbinates.

Sinuses. Antra clear, sphenoid—left contains pus.

Pharynx, larynx and ears negative.

Mouth. Teeth in poor condition.

Neck. Rigidity, painful to flexion.

Chest. Lungs and heart negative.

Abdomen. Negative.

Extremities. Weakness of the right hand. Fine tremor of the left fingers with the arm extended.

Legs. Left K. J. not obtained. Right questionable.

Temperature 99.8. Pulse 84. Respirations 20.

Blood Pressure 130/70.

Laboratory Tests

Urine negative.

Blood. R. B. C. 4,200,000. Hemoglobin 80 per cent.

W. B. C. 12,400—81 per cent. polymorphonuclears 19 per cent. lymphocytes.

Chemistry. Non-protein nitrogen 30. Sugar 90.

Creatinin 1.5.

Wassermann test. Negative.

Spinal fluid. Increased pressure, slightly turbid.

Cells 180, 88 per cent. lymphocytes.

Globulin increased.

Culture no growth.

A diagnosis of left frontal abscess was made and the patient was removed to the neurological service.

Additional Findings in the Neurological Status

Cranial nerves.

1. No coöperation.
2. Fundi as above. Fields concentric constriction.
- 3, 4, 6, pupils normal, no nystagmus.
- 5, 8, 9, 10, 11, 12, normal.
7. Some peripheral weakness of the right face.

Power and coördination.

Good in all extremities. No asynergia of the arms or legs. Station and gait not tested. Fine tremor of the left fingers with the arm extended.

Reflexes.

Superficial. Corneals present and equal.

Abdominals weak and transient.

Plantar normal. No Babinski.

Deep. Arms present and equal.

Knee, ankle and hamstring jerks greater on the right.

Sensation. No changes.

Position. No coöperation.

"Tache" Cerebral. Present.

Stiff neck and a bilateral Kernig sign.

Meningococcus meningitis was suspected because of the increasing meningeal signs. A spinal tap on the fifth of September, ten days after admission, revealed a fluid that had a glazed appearance, with slightly increased pressure, globulin three plus, sugar absent, cells 540 per c. mm. 90 per cent. lymphocytes. Pellicle formed on standing. Stained smear revealed no organisms and culture showed no growth.

The patient became increasingly drowsy.

Antimeningococcus serum, 20 c.c., were given intraspinally on the seventh of September. The 40 c.c. of the spinal fluid removed showed a moderately cloudy fluid

under slightly increased pressure, globulin three plus, sugar absent, cells 600, 94 per cent. lymphocytes. The spinal fluid Wassermann reaction was negative, the colloidal gold curve was 5554331000. A distinct pellicle formed on standing. A smear of this pellicle showed an occasional dark staining round body, the size of a small lymphocyte. Also the cells appeared to be degenerated. Culture of the fluid showed multiple white elevated colonies appearing after forty-eight hours. Smear of these colonies showed round Gram-positive bodies which after further incubation disclosed the budding forms of yeasts. No mycelia were noted. There was no acid or gas noted in any of the following sugars: lactose, dextrose, maltose, saccharose, mannite or inulin. There was no acid reaction or coagulation in litmus milk. Repeated staining by the Ziehl-Nielson method for the tubercle bacillus was negative.

Two cubic centimeters of the spinal fluid were injected into the peritoneal cavity of a guinea-pig at this time. The guinea-pig was alive and healthy after six months when it was killed. Autopsy of the guinea-pig showed no gross pathology. There was the suggestion of an inflammatory reaction about the site of inoculation, but on microscopical section this was found to be nothing more than a beginning degeneration of the recti muscles.

The antimeningococcus serum had no effect.

On the following day, the eighth of September, .2 c.c. of Old Tuberculin was injected intradermally which gave a local but no focal reaction. There was a slight rise in temperature to 100.2°.

Throughout his stay in the hospital the patient's temperature remained at 99° with only two rises, one to 101.2° and the other to 102°. The pulse remained at 80 and the respirations at 21.

Spinal taps were performed daily for the relief of pressure. The findings were: On the ninth of September 20 c.c. of a cloudy fluid was withdrawn under increased pressure, globulin four plus, sugar absent, cells 480, lympho-

cytes 60 per cent. A pellicle formed on standing. Smear and culture as above. Samples of this fluid were given to Dr. Josephine B. Neal of the Board of Health Laboratories in New York City who identified the organism as the torula by smear and culture.

The patient became noisy, restless, irrational and incontinent of urine and feces. He complained continuously of headache and stiff neck.

Daily spinal taps from the eleventh to the day of his death showed a cloudy fluid under increased pressure, globulin four plus, no sugar, 460 cells of which 60 per cent. were of the lymphocyte type. On the fifteenth of September, the day before his death, the cell count rose to 1600 with the same proportional differential count.

The patient was irrational, stuporous, lying with his back arched and his neck stiff. He also had difficulty in swallowing fluids. He developed the signs of a bronchopneumonia and died on the following day.

The necropsy was refused.

This case is the twenty-third torula infection reported in man, nineteen of which have occurred in the central nervous system with a fatal termination. The essential features of the cases reported in the central nervous system are their insidious onset, their chronicity, the low grade of fever, the slow rate of the pulse and respirations, the negative blood and serological findings, and the spinal fluid changes. The latter closely simulate tuberculous meningitis with the increased globulin, the absent sugar, the relatively low cell count, the lymphocytosis and the pellicle formation. The accurate distinction is only made by the isolation of the torula organism either from the pellicle or from cultures.

Clinically the picture is that of a subacute or chronic meningitis or an intracerebral lesion (tumor or abscess). There are no features characteristic of this type of infection. Diagnosis is possible only by detection of the organisms in the spinal fluid or in the tissues at necropsy.

We wish to thank Dr. Foster Kennedy, chief of the Neurological Service, and Dr. Douglas Symmers, Director of Laboratories at Bellevue Hospital, for their courtesy in permitting us to report this case.

THE SYNDROME OF DIABETES INSIPIDUS, EXOPHTHALMOS AND DISEASE OF THE MEMBRANOUS BONES

(ABSTRACT)

LOUIS HAUSMAN and WALTER BROMBERG

This unique symptom complex is of particular interest in its bearing on the mechanism of diabetes insipidus and the possible relation of the latter to the disease of the membranous bones.

Case report: Boy, three and one-half years old, with a history of exophthalmos, polydipsia and polyuria. Ancestry of the child revealed no pertinent facts. Mother and father are living and apparently perfectly well. A brother, one year old, so far has developed normally. At birth the patient suffered apparently from asphyxia neonatorum and convulsions, following protracted labor. This condition disappeared soon after birth. Up to the age of one and one-half years, he had repeated attacks of bronchitis. At the conclusion of the last attack, measles developed.

Present illness began about one and one-half years ago, at the age of two, when the mother noticed that the child was drinking and passing large amounts of water and that his eyes were becoming quite prominent.

Examination on admission revealed an undersized boy, measuring 78 cm., but well proportioned; mental status, normal; a most astounding and progressive exophthalmos; bilateral Babinski; marked diabetes insipidus with an intake of about 6000 c.c. daily and a corresponding output.

Osseous system: Radiography revealed a remarkable picture in the skull, consisting of large sharply defined defects particularly in the frontal and temporal regions, as if the bone had been eaten away by a rongeur. Sella turcica normal. Rest of the skeletal system entirely negative. Sugar tolerance was definitely increased. The serology of the blood and spinal fluid was negative.

Course: 1) Exophthalmos: progressive. 2) Dysostosis: progressive, spreading to the parietal, orbital, malar and mandibular areas; sella normal in all plates. 3) Diabetes insipidus: Prompt relief with daily injections of pituitrin.

Treatment: Various treatments were tried. The only one of value was the pituitrin, which influenced water metabolism.

Ultraviolet radiation, calcium lactate, cod-liver oil and parathormone were all tried without any apparent benefit.

A survey of the literature reveals twelve other cases. In each instance the membranous bones of the skull were involved, although in several cases other parts of the skeleton were also invaded. The disease occurs chiefly in children. The pathogenesis is unknown, although the incidence of antecedent infection is high. The course is progressive in most instances.

The evidence points to the tuber cinereum as the seat of the lesion, in which the tubero-infundibular mechanism is especially involved. The latter is apparently mediated through a bundle of nerve fibers from the nucleus supra-opticus of the tuber cinereum to the infundibular process, so that the latter is under the influence of the former. This functional and anatomical continuity is in keeping with the embryologic facts. The relation of this mechanism to the anterior pituitary lobe and to the process of growth, dysostosis, carbohydrate metabolism and adiposogenital dystrophy was also considered in the light of recent experimental data.

The conclusion was reached that the dysostosis may be interpreted as a parainfundibular manifestation. The

study was extended to the consideration of some of the other osseous dystrophies, such as: 1) The hereditary cleidocranial dysostosis described by Marie and Sainton, 2) the familial craniofacial dysostosis described by Crouzon and 3) Paget's disease. A critical analysis of these conditions strongly suggests the possibility that they are all closely allied to the type herein described.

TRAUMATIC PNEUMOCEPHALUS, OPERATION AND RECOVERY *

THEOPHILUS P. ALLEN

In May 1926 Dandy¹ reviewed the literature on pneumocephalus and analysed twenty-eight case reports, three of which were his own. In December of the same year Bullock² made a similar study analysing sixteen cases including one of his own and not including Dandy's three. Since then Davidson,³ Eggers,⁴ Jean and Villechaise,⁵ Jansson,⁶ Richards,⁷ Nessa,⁸ and Levison,⁹ have added eight cases. These with the present report make a total of thirty-eight. Of this group, fracture of the skull involving a frontal sinus was responsible for the pneumocephalus in twenty-three or sixty per cent. of the cases. The other causes were erosion of the walls of the ethmoid sinuses by chronic infection, erosion of the floor of the skull by a tumor, fracture thru the ethmoid sinuses, fracture thru the sphenoid sinus, fracture thru the mastoid, operation on the mastoid and brain abscess caused by gas forming bacilli.

The case here reported is one of the twenty-three in which fracture thru a frontal sinus was responsible for the pneumocephalus. All of these cases showed a striking similarity in the clinical picture and the pathological findings. The common symptoms were rhinorrhea, headache, mental confusion, dizziness, peculiar noises in the head, convulsions and hemiplegia. Papillo-edema occurred but was not particularly common. The X-ray generally

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showed a pocket of air in the substance of the frontal lobe, air in the ventricles and occasionally air in the subarachnoid space as well. Dandy¹ considered that the sequence of events in the production of the pneumocephalus was as follows: The meninges and the cortex are ruptured at the time of the fracture and the injured cortex, pia and arachnoid become adherent to the dura. Then with periods of increased pressure within the sinus such as might be caused by sneezing, coughing, straining or even swallowing, air is forced into the substance of the brain and trapped by a valve-like communication between the dura and the fractured bone or a collapsible sinus tract in the soft brain tissue. With repeated periods of increased pressure the air pocket enlarges and finally ruptures into the ventricle. Of course there may be an additional communication with the subarachnoid space thru which the air has access to the ventricles or either condition may exist alone. Our case is quite typical of its group.

No. A 12122 H. Male. Age 42. Admitted to the New York Neurological Institute, September 18, 1926.

Two months before admission the patient was found unconscious after his car had crashed into a post. He was taken to a hospital where he was found to have an extensive comminuted fracture of the frontal bone. He was unconscious for three days, disoriented and confused for about four weeks, then improved and was discharged September 1st. At home his family considered that he was normal except that he was inclined to talk too much. September 8th, ten days before admission and fifty days after the injury, while walking from his bed to the toilet a large amount of clear watery fluid suddenly escaped from his nose, he became faint and suffered a severe headache. The rhinorrhea occurred repeatedly at irregular intervals, the headache persisted and the patient became progressively confused, disoriented and demented. He soiled and wet the bed regularly and had to be spoonfed. Most of the time he lay quietly in bed as if in a mild stupor but he was easily aroused and complained bitterly of headache. At

times his mind seemed to be clearer and occasionally he got out of bed and wandered aimlessly about the house.

Examination on admission showed the following: He was sluggish, untidy and had the peculiar expression of a patient with marked mental disturbance. With this there was a shallow defensive facetiousness. For example when asked to show his teeth he did not comply but remarked, "My teeth are not as good as yours." He could be persuaded to carry out only the simplest orders after much urging and demonstration. He exhibited no initiative, asked no pertinent questions, volunteered no information. Left to himself he lay quiet and was completely indifferent to his surroundings. Attention, concentration and judgment were markedly impaired, he was disoriented for time and place and showed no insight insofar as his mental state was concerned. He walked with feet kept wide apart in a slow uncertain shuffle. Over the right frontal region of the head the scalp and bone were elevated about one centimeter to form a triangular plateau, one edge of which was five centimeters long, the other six. Percussion over this elevation gave a remarkably resonant hollow note. In the left fronto-parietal region there was a shallow stellate depression over which the percussion note was more resonant than normal. On the right side of the body the deep reflexes were slightly increased, the superficial reflexes diminished, the Babinski toe sign was present and muscle coördination and strength were slightly impaired. It was considered that these signs were due to the stellate depressed fracture over the left side rather than to a pneumatocele on the same side. The only neurological disturbances on the left were paresis of the lower facial musculature and a slight widening of the palpebral fissure. He could not recognize common odors. The optic disc margins were hazy and the veins engorged. The rest of the examination was negative.

The roentgenograms showed extensive stellate fractures of the frontal bone with one fissure thru the right frontal sinus and extending forward into the cribriform plate.

The coronal suture was involved and the right half of the frontal bone was separated at the bregma and slightly raised. There was a large pneumatocele in the right frontal lobe and air in the ventricular system. Over the left fronto-parietal region there was a shallow depressed stellate fracture.

The spinal fluid was dirty yellow in color, contained eighty-one cells per cubic millimeter, and one hundred and fifty milligrams of protein per hundred cubic centimeters of fluid. The other laboratory data were without significance.

September 27th, seventy days after the accident, the patient was operated on by Dr. Elsberg. Utilizing the old fracture lines and the elevated fragment of bone, a right frontal bone flap with its base placed anteriorly was turned down. The dura was found to be very tense and covered by a layer of organized blood clot about two millimeters thick. The right frontal lobe was then punctured and considerable air escaped; this reduced the tension of the dura. Next the cortex was exposed by wide incision of the dura and found to be soft and fluctuating. The needle was again inserted allowing more fluid and air to escape. The bulging right frontal pole was carefully separated from the dura; toward the mesial side there were some fine adhesions and after these had been divided considerable clear yellow fluid ran out. The surface of the frontal lobe now became concave so that little retraction was needed to bring the orbital plate into plain view. Other adhesions were separated and just behind the frontal sinus a small perforation of the dura was found. It was about two millimeters in diameter and rimmed with a brownish discoloration about one millimeter wide. A probe passed thru this hole came upon irregular bone, undoubtedly the fracture line in the posterior wall of the sinus. A piece of temporal muscle was placed over the perforation and a second piece over the opening toward the mesial surface thru which clear yellow fluid had flowed. The cavity left between the dura and the brain by

the brain's collapse was filled with normal salt solution and the dura closed by a continuous silk suture. Along the edges of the old fracture line the bone was trimmed so the edges approximated and thus the old deforming elevation was removed. The scalp incision was closed by a galea and skin sutures of fine silk. A twenty-four hour drain was passed down to the dura at one spot because of some venous oozing.

The postoperative course was rather stormy. The temperature remained above normal for eight days, ranging from 101.6° to 102.4° Fahrenheit. For five days the patient's neck was stiff and there was a suggestion of a Kernig sign. On the third day about half an ounce of blood-stained fluid was discharged from the right nostril, this recurred from time to time until the eleventh day when it ceased permanently.

By the thirteenth day there was a very definite change in his mental status. He was oriented, had insight, fed himself and controlled his excretions. On the sixteenth day after operation X-ray examination showed no evidence of pneumocephalus; there was no mental abnormality, the pyramidal signs on the right side had disappeared except for slight diminution of the abdominal reflexes and absence of normal plantar flexion. Strength, coördination and gait were normal; odors were recognized; the optic discs were slightly pale but the veins were of normal size. The left facial paresis was gone; the inequality of the palpebral fissures remained; there was no visible bone deformity in the frontal bone. The percussion note over the flap had the customary resonance of a flap but nothing of the hollow drumlike quality present during pneumocephalus. Over the rest of the skull the note was a normal flat and high pitched one.

Three months after operation complete examination showed only very slight pyramidal signs and slight disturbance of tactile discrimination in the right lower extremity. X-ray showed no evidence of air within the

cranium. There were no subjective symptoms whatsoever. The patient had been working regularly for two months.

Twenty-seven months after operation in answer to a follow-up letter he wrote, "I am feeling fine; nothing bothers me whatever."

In his article Dandy¹ says: "It hardly seems possible to make an absolute diagnosis of pneumocephalus from any combination of signs and symptoms except one, sneezing followed by cerebrospinal rhinorrhea." Teachenor¹⁰ contends that the roentgenogram is the only method of diagnosis. In this case a positive diagnosis was made long before the roentgenograms were taken and the deciding factor in establishing the diagnosis was an easily elicited physical sign, namely, the extraordinary resonant percussion note of the skull. Jean and Villechaise⁵ also noted this sign in their case. In every instance of pneumocephalus careful examination of the skull by percussion should reveal a characteristic change of the percussion note over the region of the brain in which there is a large collection of air.

Of the thirty-eight cases twenty were operated on and six died, thirty per cent. fatality. Of the eighteen cases not operated on seven died, thirty-nine per cent. fatality, and several authors concluded that surgery was not advisable for it appeared that the patient had an equally good chance of recovery without it. However, on reviewing the operations in cases where the entrance of air was due to a frontal sinus fracture, it was found that in only seven cases was a definite attempt made to shut off the communication between the air pocket and the sinus. Of these seven, only one died, fourteen per cent., and the rest recovered promptly with minimum residual symptoms. Certainly in this type of case where the point of entrance of the air is so easily accessible, and where there is presumption or proof that the air pocket is enlarging or stationary, any intelligent attempt to block the passage is justified.

SUMMARY

1. The report of a case of pneumocephalus is added to the thirty-seven already recorded in the literature.

2. A change in the percussion note of the skull is suggested as a diagnostic sign of this condition.

3. An attempt to correct the condition by operative procedure is justified in selected cases.

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Section of Medicine, March 20, 1928

MEDICAL PROBLEMS IN THE DIAGNOSIS AND TREATMENT OF CANCER

LLOYD F. CRAVER

The treatment of cancer, before the advent of radiation, was generally regarded as an exclusively surgical problem. The inoperable case was condemned to unsatisfactory makeshift medical treatment, or was sent to an institution for incurable disease. Modern radiation methods, however, have not only brought about a great change in the prognosis of many forms of cancer, but also, because of their attractiveness to the patient, have made possible the collection in hospitals of large numbers of cases in all stages of the disease.

The field has thus become so broad that it includes, in addition to cases suitable for operation, many in which a great deal of additional treatment, medical and radiological, is required; other varieties, such as lymphosarcoma, in which operation is contra-indicated, but in which prolonged careful medical supervision and judicious radiation can accomplish a great deal; others in which the differential diagnosis from certain medical conditions calls for a high degree of familiarity with those medical conditions; and still others in which at present the difficulties of early diagnosis and the inadequacies of our methods of treatment make it appear that one of the most useful functions the student of cancer can perform is to attempt to learn more of the causes of the disease in hopes of pointing to some means of prevention.

In an institution where all varieties of tumors are treated there are many points of contact with internal medicine. Most of the ordinary medical conditions occur and have to be treated, either in preparing the patient to withstand operative or radiation procedures, or as complications accompanying or following such procedures. For example, diabetes, hypertension and cardiorenal diseases are frequently encountered in cancer patients, many

of whom are well along in adult life and also present tumors which in themselves offer difficulties enough in treatment.

Tuberculosis comes into relation with the cancer problem in many aspects. The existence of pulmonary or some other type of tuberculosis in a cancer patient makes more difficult the treatment and proper after-care. Radiation of a tumor located in or on the chest of a patient with pulmonary tuberculosis involves exposure of the lung and consequent danger of aggravating the lung condition.

Tuberculous laryngitis, tuberculous nodes involving the wall of the esophagus and tuberculous ulcers of the mouth may simulate cancer. Pulmonary tuberculosis has to be distinguished at times from primary and secondary tumors of the lung.

The association between Hodgkin's disease and tuberculosis has long been apparent clinically, and since the work of Dr. L'Esperance, reported before the Academy recently, it would appear that certain cases, at least, of Hodgkin's disease may be due to the avian form of the tubercle bacillus.

Experience in recent years in the radiation of tuberculous nodes has shown that they may react in one of three ways: Small doses may cause inflammatory reaction with sinus formation; in other cases regression without marked inflammatory reaction results, and in some cases even heavy doses will produce no change. The last result has been seen now in several instances in which at operation caseous nodes have been removed.

Lung Metastases. The marked variations in the symptoms and signs produced within the chest by tumors, and their frequent simulation of various acute and chronic inflammatory processes, afford a most profitable study. A complete knowledge of all the manifestations of malignant diseases of the lungs would be practically equivalent to a complete knowledge of all lung lesions of whatsoever type. There is a too general tendency to rely entirely

upon the X-ray film for the early detection of metastases to the lungs and pleura. It is undoubtedly true that in many cases the X-ray film will reveal tumors in the chest when no definite physical signs can be elicited. There are, however, unquestionably some cases in which the physical signs may be present before a diagnosis can be made from the X-ray film. This is especially true in those tumors which are disseminated chiefly through the lymphatics, such as cancer of the breast.

The most constant early physical sign of metastasis to the lung is a localized decrease or absence of breath sounds. This may be the only sign.

The possibility should always be kept in mind that any patient with acute pulmonary symptoms may be suffering from a primary or secondary malignant tumor of the lung. There are numerous reports in the literature, but little is said in text books about the mistaking of malignant lung tumors for bronchitis, pleurisy, pneumonia and even empyema.

Aneurysm appears to be more frequently mistaken for tumor than *vice versa*. In selected doubtful cases the therapeutic test with radiation will probably do an aneurysm no harm, and if the tumor is of a radiosensitive type, such as most frequently occurs in the mediastinum, it will soon produce a sufficient regression to settle the diagnosis.

Pendular or tic-tac rhythm of the heart has been noted repeatedly, associated with thymomas. In other cases of thymoma or mediastinal tumor, tachycardias of varying degree are seen, some with remarkably constant rates from day to day.

The diagnosis and treatment of the whole group of diseases termed by many the lymphoblastomata is properly a medical problem. In the treatment of myelogenous leukemia ambulatory treatment with five to seven daily fractions of low-voltage X-ray limited to the splenic area

seems to have given just as prompt and satisfactory results as the use of the single application of the radium pack to the spleen, or the radiation of the long bones in addition to the spleen. The level of the basal metabolism would not be regarded as a safe guide in the treatment of leukemia.

Sternal tenderness in myelogenous leukemia is a most striking phenomenon in a large percentage of cases. In a rough way the degree of tenderness and the size of the area of tenderness usually correspond with the degree of illness of the patient. When the area is small it is nearly always located at one definite spot, the midline of the sternum at the level of the fifth costal cartilage.

When a tumor by pain or mechanical interference with the alimentary tract has prevented the patient from taking his customary diet, inordinate loss of weight may occur, and it then becomes of prime importance so to modify the diet that the patient can with comparative comfort obtain sufficient intake in terms of total calories and proteins.

Experimentation with the various so-called constitutional agents, colloidal metals, etc., is a problem for the internist. In every case treated with lead some degree of toxicity has to be combated, and careful prolonged medical supervision is an essential.

Considering the enlarged scope of the cancer problem, the medical man should find therein a large field for his activities.

PHASES OF THE PATHOLOGY, DIAGNOSIS AND TREATMENT OF CARCINOMA OF THE PROSTATE*

BENJAMIN S. BARRINGER

Most prostatic carcinomas have origin in the posterior lobe. This lobe, were it not for this fact, would remain insignificant, and almost unknown. It does not hypertrophy as do the other prostatic lobes. It lies between the prostatic urethra and the rectum, and this position makes it the most accessible of all the lobes of the prostate to palpation by a finger introduced into the rectum. It is perhaps one-half a cm. in thickness, and lies between two strong constricting fasciae.

When a cancer starts in this lobe there is no open space in which the cancer may grow, and growth takes place in a course directed by these fasciae. That course is almost never outward toward the perineum, but upwards further into the body cavity, along the posterior pelvic chain of lymphatics, and therefore still more inaccessible.

These constricting fasciae are often stretched by the growth, but while the fascia on the bladder side is frequently penetrated by the cancer that on the rectal side almost never. So we have the phenomenon of a semi-internal cancer beginning in a semi-inaccessible place, with little or no symptoms, growing in a position where it cannot be seen, but where it can be felt, early growing beyond the prostate, and becoming still more difficult to reach. In 98 per cent. of our cases, when first seen at the Memorial Hospital, the cancer had grown beyond the prostate.

These are briefly the factors which make the diagnosis and treatment of prostatic cancers difficult. Until recently,¹ specimens for pathological examination were only obtained after a surgical operation for the removal of the

*From the Urological Service, Memorial Hospital, New York.

¹ We have developed at Memorial Hospital a specimen-taking needle which may be inserted through the perineum into the prostate, and guided by a finger in the rectum. We have been able to get a specimen for examination in two out of three cases.

cancerous prostate. So we have but slowly come to recognize the great variations in the degree of malignancy of different prostatic cancers, and therefore variations in their growth rate.

It is probable that the most malignant types invade the lymphatics early, and spread rapidly through the lymphatic chains. I have seen one such case with a prostatic cancer so small as to be barely recognizable, yet with extensive lymphatic involvement, and with a large cancerous signal node, many times larger than the primary cancer, in the left supra-clavicular space. At the other end of the chain is the prostate of low grade malignancy. We have autopsied a patient with a very large prostatic cancer, almost filling the pelvis, yet with no lymphatic invasion beyond.

The most malignant cancers classified according to Broders and corresponding to Dr. Ewing's grade 3 are, because of their cellular and undifferentiated structure, what is called "radio-sensitive." That is, they are much more affected by radiation than the less malignant sclerotic types, and therefore more susceptible to control. These, the radio-sensitive group, comprise perhaps but five or ten per cent. of all prostatic cancers.

We believe it is of a great deal of importance to identify these various grades of malignancy for this reason: If a prostatic cancer is highly malignant, and is sufficiently limited in its extent so that there would seem to be a hope of controlling the cancer, then operation is the last thing to be thought of, and radiation the first.

The trauma caused by an attempt to remove a cancerous prostate, either by the perineal or supra-pubic route, cannot but help as far as I can visualize, to squeeze cancer cells into lymphatics and so spread the disease. We have seen not a few patients who had been subjected to a supra-pubic prostatectomy in whom the cancer subsequently grew through the supra-pubic wound.

A prostatic cancer, unless interfered with by operation, rarely grows in this direction. This operative hazard applies not only to the most malignant group, but to all prostatic cancers. Radiation should be employed before any contemplated operation to devitalize the cancer cells.

We have intimated that specimens for pathological examination are difficult to get from a prostate, so we make the diagnosis of radio-sensitivity by reversing the procedure. The patient gets X-ray treatment first, and the diagnosis of radio-sensitivity is made by observing the effect upon the prostate. Deep X-ray treatment should be reinforced by radium needles, inserted through the perineum into the prostate.

This applies naturally to those prostatic carcinoma, which from our examination we believe are small enough to control.

In our first series of 42 cases we controlled 5 or 10 per cent. for more than 5 years, and these 5 presented no signs or symptoms of cancer. In the next series we did not do as well. Now we are swinging back to our 10 per cent. by better methods of diagnosis and treatment.

This radio-sensitivity of prostatic cancers is the reason why we can prolong life in some extensive cancers, which, when first seen, are far beyond control. I have recently seen two cases of this group. One had metastases in nearly every bone of his body. In both patients radiation caused marked changes in the primary and metastatic tumors, and prolonged the patients' lives, as far as I could judge, one and three years respectively.

From the standpoint of diagnosis of prostatic cancer, we have come across one point of interest. We know that of all prostatic hypertrophies, perhaps 20 per cent. are cancerous—that the differential diagnosis between single hypertrophy and cancer is often difficult, and more often not made before operation.

We have in the course of a piece of research on the effect of deep X-ray therapy on hypertrophied prostates, made

the diagnosis in three different cases of what seemed to be simple prostatic hypertrophy. A few weeks after a course of deep X-ray, this diagnosis was changed to that of cancer. The prostate which formerly felt soft and regular had changed to one hard and irregular. The only way we could explain this was that a certain amount of edema had masked the underlying cancer, and the X-ray treatment had removed this edema. We believe that if this is a constant result, it may prove of considerable value in making this differential diagnosis.

While we do not entirely agree with the opinion expressed by a well-known surgeon that "Whatever one does for a patient with a prostatic cancer, one does the wrong thing," we do believe that this, in a way, voices the difficulties of treatment. Suffice it to say that at present—as far as our own experience goes—the following not too rigid rules should be applied:

(1) An attempt to control the prostatic cancer should be made in those cases in which we believe the cancer has not grown far beyond the prostate, and which show no bone metastases. Complete operative removal of a cancerous prostate does not seem feasible or possible. When this is attempted, portions of the cancer are invariably left behind. We have verified this many times by the examination of the pathological specimen removed and by the examination of the patient at various times after the operation. So, if operation is done, radiation of the prostatic and supra-prostatic areas is imperative. To my mind, radiation to control the cancer is superior to operation.

(2) The problem of the control of the cancer and the urinary obstruction are two different ones, and should be dealt with separately—the one by radiation, the other by minor operation.

(3) Extensive major operation should, as far as possible be avoided, if we can have a substitution therapy as efficient as operation. The reason for this is that we can give no assurance of cure by any method; that if we fail to cure we have deprived the patient of from 2 to 6 months

of his short remaining span of life, granting that it takes from 2 to 6 months to recover from this major operation. We know that the large majority of patients will not live for 2 years after first seen. In 102 consecutive cases seen at the Memorial Hospital, but 15 lived over 3 years, 6 over 4 years, 5 over 5 years, and 3 over 7 years.

(4) In the control of symptoms, sciatic and various other nerve pains, and pressure edema of the legs, radiation may accomplish much, or may fail.

This ends my very brief summary of treatment. We are at present only at the threshold of knowledge, both as to the cause and the control of prostatic cancer. We must insist upon regular examinations of the prostate in all persons over the age of 60. Such examination should be a part of the periodic examination of the heart, blood vessels, kidneys, etc. We must, above all, keep our minds open to new suggestions, new leads, change one thing here, and try another there. We should always be reluctant to place patients in the hopeless class. I vividly remember a patient who came to the Memorial Hospital so labelled. He had a large extensive carcinoma of his prostate, but his only symptom was severe pain in his left hip. A moderate amount of radiation entirely relieved this pain. He has remained quite well for three years, and to-day at the age of 80 still enjoys life.

If we progress, the seemingly hopeless case of to-day may become the promising one of tomorrow.

Section of Obstetrics and Gynecology, March 27, 1928

INFLUENCE OF SUPPLEMENTARY FEEDING OF CARBOHYDRATE ON LACTATION

JOHN E. TRITSCH

The investigation was conducted for the purpose of determining whether supplementary feeding of considerable amounts of carbohydrates or of different kinds of carbohydrates, would influence:

1. The quantity of milk secreted by the mother
2. The composition of the milk, or
3. The growth of the growing infant.

Four series of normal lactating mothers were observed at Flower Hospital. The first three were conducted practically simultaneously, in order to have the same seasonal influences in all. The fourth group was begun somewhat later than the others. The only difference in the four groups was the supplementary feeding of carbohydrate or fat.

Group 1 received the regular hospital ward diet, in other words was the control group.

Group 2 received the same diet as group 1, excepting that the noon-day dessert was omitted and 60 grams (uncooked weight) of rice was added daily. The rice was used for preparing a noon-day dessert and for cereals, beverages, soups, etc.

Group 3 was similar to group 2, with tapioca replacing rice.

Group 4 was a further control in which the carbohydrate additions of groups 2 and 3 were replaced by the equivalent in calories of a high fat food, namely cream.

The hospital diet had a caloric value of about 2600, each of the others having about 3000 calories.

The special diet carefully weighed in the kitchen, began about 24 hours after delivery. This was under the supervision of a graduate nurse, who recorded observations concerning diet and lactation, weighed the infants at the same hour each day, and also on the 7th day postpartum, determined the intake of the infant by weighing before and after nursing. On the 5th and 9th days, at the same hour of the day, one breast was completely emptied by an electric breast pump and the milk thus obtained measured and analyzed.

The subjects, when discharged on about the 11th day, were requested to continue their dietary regime at home and to report at the clinic every two weeks up to the 6th week. At these visits the baby was weighed and at the 4th and 6th week visits the breasts were pumped for milk analyses. Naturally, this post hospital period is of little experimental value because of the lack of uniformity of diet, etc.

The number of cases was as follows: Group 1—17, Group 2—36, Group 3—40, Group 4—34; Total 127.

GAIN IN WEIGHT OF INFANT

There was no significant difference in the average daily gain in weight of the infant from the 5th day until discharge. The average of all 127 cases was 1.00 ounce a day. As the lowest group average was 0.90 ounce and the highest 1.09 ounces, no definite conclusion can be reached.

PERCENTAGE OF INFANTS REGAINING BIRTH WEIGHT AT THE HOSPITAL

Even though the average gains of the infants show no important variations, the proportion of infants gaining their birth weight by about the 11th day does show wide variations. The cream group regained their birth weight in the greatest proportion (55.9 per cent.) the rice and tapioca groups next (47.2 and 40.0 per cent. respectively) and the control in only 29.4 per cent. Too much stress

should not be placed on these differences, because, even in a study of 127 cases the fluctuations of a few cases in either direction will change the percentage figures appreciably.

AVERAGE INTAKE OF INFANT

The tapioca and rice groups consumed an average of 2.47 and 2.40 ounces respectively, the cream group 2.01 and the control 1.84 ounces.

AVERAGE VOLUME OF MILK OBTAINED BY THE BREAST PUMP

In conformity with the results on the intake just mentioned the average volume secreted as determined by measuring the milk obtained by the electric breast pump, was greatest in the two carbohydrate groups. The averages for the 5th and 9th days were 70.0 c.c. and 69.5 c.c. for the rice and tapioca groups respectively. However, here the controls without supplementary feeding were next (65.5) and the cream group last (57 c.c.).

DIFFERENCES IN THE COMPOSITION OF MILK

This is the largest series of human milk analyses ever made under standardized conditions of diet, etc. It was found that the changes of diet did not influence the protein content to any appreciable extent. The cream diet was the only one to increase the fat content on the 5th day but by the 9th day all groups had about the same percentage of fat. As regards lactose, the cream diet and the tapioca diet both increased the sugar on the 5th day, and on the 9th day the rice group also had a high lactose content in the milk.

Although the milk of the cream group was made "richer," the smaller volume led to a low caloric content per specimen obtained, as shown by the following figures.

CALORIES IN AVERAGE SPECIMEN OBTAINED

1	2	3	4
Hospital diet	Rice group	Tapioca group	Cream group
44.0	45.6	44.2	38.4
Averages of 5th and 9th days.			

PARITY AND AGE OF MOTHER

Considering this subject from the standpoint of age and parity in all groups, it is interesting to note that the younger mothers (16-20 years of age) secreted larger quantities of milk and their infants gained weight more rapidly than those in any other five year period group. That this was not due to a greater proportion of primiparae is indicated by the fact that on considering the subject by parity, the para-three patients secreted a larger amount of milk and their infants gained more weight per day than those of any other parity.

RADIATION THERAPY IN GYNECOLOGY

IRA I. KAPLAN

The method of Radiation Therapy as employed at Bellevue Hospital, New York City, in the treatment of gynecological conditions is described. Statistics showing the number of cases treated and specific details of typical cases are given.

Both benign and malignant conditions are treated and the details of the therapy used is described.

The modalities employed are x-rays, radium and high frequency currents in the form of diathermy and surgical endothermy. The indications for the employment of these are described. The type and form of therapy chosen for any case depend on various factors; whether the treatment is palliative or curative; whether or not the lesion is localized and readily accessible, or widely disseminated, and on the general condition of the patient.

The type of treatment varies also with the requirements of the case, whether the desire is for stimulation of a hypofunction, or inhibition of a hyperfunction, or to destroy a new growth, or for symptomatic relief.

As a general rule x-rays are used in cases with large, disseminated, deep-seated lesions and radium in locally accessible areas. Surgical endothermy is used for removing excessive local lesions and as an aid to radium therapy in the treatment of malignancy of the cervix. Medical diathermy in the treatment of pelvic infections has given good results.

The presence of infection, the size of the tumor or the extent of the lesion does not necessarily act as a contra-indication to radiation therapy.

In benign conditions radiation is offered as an alternate method of procedure in place of surgery, and as a new method of procedure in the treatment of functional disturbances.

In malignancy it is the method of choice either used alone, or in conjunction with surgery. In malignancy of the cervix it is the only method used in our service.

Biopsy is done in all cases of malignancy, but as yet no firm conclusion as to the effect of histological characteristics on the choice of radiation is definitely established. The most frequent histological type is plexiform epithelioma.

Detailed statistics of the therapy of functional conditions, of fibroids and of malignancy of the cervix are given.

Radiation is not offered as a panacea, but does offer a tried method for aiding the gynecologist in his efforts to treat efficiently some conditions otherwise not readily controllable.

The radiation therapist works in coöperation with the gynecologist in the treatment of all cases.

DIAGNOSIS AND PREVENTION OF CARCINOMA OF THE CERVIX

FRANK A. PEMBERTON and GEORGE VAN S. SMITH

Endocervicitis and erosion of the cervix are commonly found before the development of cancer and are usually present for years before cancer appears. They probably function as an etiological factor by keeping the epithelium covering the cervix and its canal in a state of unrest. The early differential diagnosis between inflammatory and repair processes and carcinoma depends on the change in the basal layer of the epithelium.

Carcinoma rarely develops after the above conditions are relieved. All inflammations and erosions of the cervix should be considered as possible precursors of cancer. Therefore they should be watched anyway and treated if severe or if the patient is in the carcinoma age. The treatment may be by cauterization, amputation, radium or repair.

PROCEEDINGS OF ACADEMY MEETINGS, MARCH

STATED MEETINGS

Thursday Evening, March 1, at 8:30 o'clock

I. EXECUTIVE SESSION

Election of Fellows

II. PAPER OF THE EVENING

Concerning certain ocular interpretations of cardio-vascular, renal, metabolic and intracranial disorders; an illustrated lecture, George E. de Schweinitz, Professor of Ophthalmology, Graduate School of Medicine, University of Pennsylvania, Philadelphia

A collation (Loomis Entertainment Fund) will be served after adjournment, to which the Fellows and guests are invited.

Thursday Evening, March 15, at 8:30 o'clock

I. EXECUTIVE SESSION

II. PAPERS OF THE EVENING

- a. The present status of physical therapy, Frank B. Granger, Physician in Chief for Physical Therapy, Boston City Hospital (by invitation)
- b. Experimental inoculation of chickens with Hodgkin's nodes, Elise L'Esperance
Discussion, James Ewing

SECTION MEETINGS

SECTION OF SURGERY

Friday Evening, March 2, at 8:30 o'clock

ORDER

I. READING OF THE MINUTES

II. PRESENTATION OF CASES

- a. 1. Epithelioma of the superior maxilla, resection
2. Epithelioma of vulva, radical operation with bilateral inguinal node dissection
3. Gunshot wound of spleen, splenectomy with the aid of osteoplastic resection of costal arch, H. Willy Meyer
- b. 1. Exophthalmic goitre four years and eight months post-operative
2. Tetany following lobectomy for adenomatous goitre
3. Exophthalmic goitre in a nine year old child, J. William Hinton
- c. Patient with massive collapse of lung demonstrating etiology and effective method of treatment, Charles L. Gibson

III. PAPER OF THE EVENING

Clinical history of goitre, Dean Lewis, Baltimore (by invitation)

IV. DISCUSSION BY

Nellis B. Foster, Emil G. Grah

SECTION OF DERMATOLOGY AND SYPHILIS

Tuesday Evening, March 6, at 8:30 o'clock

ORDER

I. PRESENTATION OF PATIENTS

- a. Cases from the Post Graduate Medical School and Hospital, George M. MacKee, Fred Wise, I. Rosen, David Satenstein, Max Scheer, E. W. Abramowitz, Van Alstyne Cornell, Joseph Jordan Eller
- b. Miscellaneous cases

II. DISCUSSION

III. EXECUTIVE SESSION

Note: Examination of cases is limited to members and their invited guests

SECTION OF PEDIATRICS

Thursday Evening, March 8, at 8:30 o'clock

(promptly)

ORDER

I. PAPERS OF THE EVENING

- a. The sex factor in infant mortality, Harry Bakwin
Discussion, Alfred F. Hess
- b. Congenital intestinal obstruction, Richard W. Bolling
Discussion, Henry W. Cave, John M. Hanford
- c. A possible causal factor in food allergy of infants, Bret Ratner
Discussion, Arthur F. Coca, Oscar M. Schloss

Attention: Tri-City Meeting—Philadelphia, Saturday, October 13, 1928

SECTION OF OTOTOLOGY

Friday Evening, March 9, at 8:30 o'clock

ORDER

I. READING OF THE MINUTES

II. PRESENTATION OF CASE

Demonstration of a new method of determining unilateral deafness and malingering, John Guttman

III. PAPERS OF THE EVENING

- a. Primary jugular bulb thrombosis with a report of nine cases, Jacob L. Maybaum, Irving Goldman (by invitation)
Discussion by Reuben Ottenberg
- b. Tuberculosis of the middle ear
 - 1. From the clinical standpoint, Gerard H. Cox (by invitation)
 - 2. From the pathologist's standpoint, James G. Dwyer

IV. GENERAL DISCUSSION

V. EXECUTIVE SESSION

a. Cystoscopic lithotrite, Julius J. Valentine

b. 1. A new cystoscope

2. A new cystoscopic lithotrite, Abraham Ravich (by invitation)

III. REPORT OF CASES

Dermoid cyst of the kidney, Julius J. Valentine

IV. PAPER OF THE EVENING BY

William Lower, Cleveland (by invitation)

V. GENERAL DISCUSSION

SECTION OF OBSTETRICS AND GYNECOLOGY

Tuesday Evening, March 27, at 8:30 o'clock

ORDER

I. READING OF THE MINUTES

II. PAPERS OF THE EVENING

a. Influence of supplementary feeding of carbohydrate on lactation,
John E. Tritsch (by invitation)

Discussion opened by Dever S. Byard, Israel S. Kleiner, Ph.D.
(by invitation)

b. Radiation therapy in gynecology, Ira I. Kaplan

c. The diagnosis and prevention of cancer of the cervix, Frank A.
Pemberton, Boston (by invitation)

III. DISCUSSION BY William P. Healy, Frederick C. Holden, Max Cutler
(by invitation), Douglas Symmers

IV. GENERAL DISCUSSION

V. EXECUTIVE SESSION

SECTION OF LARYNGOLOGY AND RHINOLOGY

Wednesday Evening, March 28, at 8:30 o'clock

CLINICAL EVENING

ORDER

I. READING OF THE MINUTES

II. PRESENTATION OF CASES BY THE MANHATTAN EYE, EAR AND THROAT
HOSPITAL

From the Clinics of E. Ross Faulkner, John E. Mackenty, Samuel
McCullagh, Harmon Smith

ORGANIZING CONVALESCENT CARE

REPORT OF PROGRESS

BY

THE ADVISORY COMMITTEE ON CONVALESCENCE OF THE
HOSPITAL INFORMATION AND SERVICE BUREAU

After making a comprehensive study of the facilities for convalescent care in New York City in 1924, the Committee on Public Health Relations of The New York Academy of Medicine appointed four subcommittees, on each for Medicine, Surgery, Neurology and Pediatrics. These committees were assigned the task of formulating the standards for convalescent care in their respective fields. Their recommendations were approved by the Committee on Public Health Relations, published in the Hospital Social Service Magazine in July, 1925 and later reprinted in several other magazines.

The entire matter was then referred to The Hospital Information and Service Bureau of the United Hospital Fund as the organization best qualified to continue the work. Dr. George David Stewart, as Chairman of the Executive Committee of the Hospital Information and Service Bureau, appointed a committee of representatives of various homes and social agencies interested in convalescence, with a member of the Public Health Relations Committee of the Academy as its Chairman, to serve as an Advisory Committee on Convalescence. Later the Advisory Committee was elected as the Executive Committee of the Section on Convalescence of the Welfare Council. The Committee is at present serving in this dual capacity.

Organizing Convalescent Care

From the very beginning of the study, it was evident that there was not sufficient factual information available in regard to Convalescent Homes to warrant the formulation of any definite constructive program with regard to the problem. The committee therefore initiated a series of studies dealing with the varied phases of the situation.

Thus considerable material of interest and importance has been gathered and in this report, I shall briefly outline the main results of these studies, reserving for a future report other matters which are still occupying the attention of the committee, and for which up to the present time no immediate solution has been found.

In planning the studies the committee had in mind three purposes: To bring about a more complete utilization of existing facilities, to raise the standards of the Convalescent Homes, and to eliminate wasted or misdirected effort.

1. *Directory of Convalescent Homes*

The first activity of the committee was the revision and enlargement of a preexisting directory of the agencies which maintain convalescent facilities. Such a revision was published in 1926 and a second edition in 1927.

2. *Central Information Bureau*

The committee received reports to the effect that there was a general lack of provision for certain types of convalescents, and that hospital social workers were frequently unable to place patients in certain Homes. These reports gave the impression that all the existing institutions were full to capacity most of the time and that a large waiting list of applicants was the rule. A study of the situation revealed, however, that overcrowding is merely seasonal, occurring especially in the summer time and that there are frequently vacancies in some Homes while others are filled. Believing that some relief for this condition might be afforded by the establishment of a central information bureau where a census of available facilities could be kept and to which anyone desiring to place a patient in a Home could apply and learn where a patient might with certainty be placed at a given time, the committee has established such a service. Several Homes are now coöperating with the Bureau and telephone regularly to report vacancies. In 1926, 171 requests for information and placement of cases in Homes were received

and in 1927, 470 such requests were answered. As this service is becoming more widely known, it is being more extensively used and its value is being generally recognized.

The Bureau is not intended to supplant the present existing admission offices of the Homes, but simply to serve as a source of information with regard to available facilities at all times.

There are, however, many Homes which do not maintain admission offices in the city, due in most instances to the additional expense involved, and the Bureau has been requested to act in that capacity for some of them. At present the Bureau is furnishing this service to seven Homes.

3. *Record of Utilization of Convalescent Homes*

The committee has been keeping a record of the annual utilization of the Convalescent Homes and annually prepares tables showing the percentage of utilization of the facilities in various types of Homes. This information is published as an appendix to this report. In considering the percentage of annual utilization, it should be borne in mind that an average utilization of 90 per cent. connotes full utilization, in view of seasonal variation in illness and in view of the fact that time must be allowed for renovations and the like.

4. *Negro Convalescence*

At the request of the Urban League, an organization interested in the negro, the committee took under consideration the problem of negro convalescence. Those in charge of convalescent homes are rather unanimously of the opinion that the presence of negroes among the patients is a disturbing factor and is detrimental to the peace of mind of the white inmates, thus interfering with one of the most important factors in convalescent treatment. This feeling is so prevalent that the majority of Homes are loath to receive even a small number of negroes, and many bar them

entirely. In consequence, there is a lack of facilities for the convalescent care of the negro, and the committee has called attention to the need of establishing an institution for this purpose, either as a separate Home or as a separate unit in an already existing institution.

5. *Convalescence of Neuropsychiatric Patients*

A study of facilities for the care of the convalescing neurological or psychiatric patient likewise brought out a great need of suitable provision for this type of patient. It was ascertained that only forty beds were available when 700 were needed. The findings of the subcommittee which undertook a critical study of this field were published in pamphlet form by the Sturgis Research Fund.

6. *Chorea*

A report has been made on the value of convalescent care for choreic patients, based on a study of facilities and the results of convalescent care.

7. *Fire Hazard*

A rather serious fire, which occurred in one of the Homes, was responsible for a survey to determine the extent of existing fire hazards. In many of the Homes the precautions against fire were inadequate and below the standards of safety. The committee bent its energies toward urging the Homes to remedy this defect, and a salutary effect has been reported in most if not in all instances.

8. *Standardized Admission Card*

At the present time many of the Homes have their own peculiar methods of admission and of recording information concerning the prospective inmate. All require admission cards to be filled out by those desiring to place the patient in the Home, but the cards vary in size, shape, color and spaces in which to insert the desired information. This makes it necessary for anyone having to place a large number of patients in different Homes to have on hand a considerable collection of cards of varying shapes,

and if the patient fails to be admitted to one Home, another card must be made out for another institution.

To remedy this condition, the committee has prepared a uniform admission card embodying the essential data for all the Homes. Fifteen Homes are now using these cards and others will undoubtedly follow.

The committee has been functioning for only two years and the problem which has been entrusted to it is of such magnitude that it has been possible but to scratch the surface of things.

The activities outlined in this report have been fundamental and the results to date may be regarded as progress in the right direction.

ADRIAN V. S. LAMBERT,
Chairman.

UTILIZATION OF CONVALESCENT HOMES FOR ONE YEAR

FROM OCTOBER 1926 TO OCTOBER 1927

SUMMARY TABLE

Bed Capacity and Days Care

Name of Home	Total Bed Capacity	Maximum Days Care	Days Care in a Year	Actual Days Care	Per Cent. of Utilization
General Homes					
# Adults	276 W. 264 S.	90,930	69,300		66%
General Homes					
# Children	846 W. 946 S.	258,889	227,415		88%
Special Homes					
Mothers and Children	117	42,705	30,429		71%
Special Homes					
Children, Cardiac	171	62,837	55,295		92%
Special Homes					
Children, Orthop.	129 W. 152 S.	36,417	29,791		80%
Total	1373 W. 1650 S.	431,188	359,156		83%

UTILIZATION OF THE CONVALESCENT HOMES FOR ONE YEAR
FROM OCTOBER 1926 TO OCTOBER 1927
General Convalescent Homes—Adults

Name of Home	Total Bed Capacity	Maximum Days Care	Days Care in a Year	Actual Days Care	Per Cent. of "Utilization"
1. Isabella Home	28	10,220		8,213	80%
2. Margaret and Sarah Switzer Foundation					
*Sunnyside Farm	52	11,024		3,388	31%
3. #Neustadter Home	58	21,170		14,885	70%
4. St. Andrew's	} 30 W. 18 S.	9,096		4,625	
5. #Solomon and Betty Loeb Memorial Home.....		39,420		38,189	51%
	108				97%

General Convalescent Homes—Children

Name of Home	Bed Capacity	Maximum Days Care	Days Care in a Year	Per Cent. of "Utilization"
1. Babies Hospital, Country Branch	55	4,600	4,216	91%
2. Children's Aid Society **Elizabeth Milbank				
*Anderson Home.....	160	48,640	38,629	80%
3. ***Milbank Memorial Home	50	15,200	14,391	95%
4. ****Martha Home	15	4,560	4,299	94%
5. Convalescent Home for Hebrew Children	$\left\{ \begin{array}{l} 100 \text{ W.} \\ 200 \text{ S.} \end{array} \right.$	43,440	40,189	92%
6. Holiday Farm	50	18,250	15,300	84%
7. Josephine Home	50	18,250	16,557	91%
8. #Neustadter Home	58	21,170	14,885	70%
9. New York Hospital, Campbell Cottages	86	31,390	27,399	87%
10. Speedwell Society, Yonkers Unit	24	9,074	9,074	100%
11. #Solomon and Betty Loeb Memorial Home	108	39,420	38,189	97%
12. *****Surprise Lake Camp	50	4,895	4,287	88%

Special Convalescent Homes—Mothers with Children

Name of Home	Bed Capacity	Maximum Days Care	Days Care in a Year	Per Cent. of "Utilization"
1. A. I. C. P., Caroline Rest	117	42,705	30,429	71%

Special Convalescent Homes—Children Cardiac

Name of Home	Bed Capacity	Days Care in a Year		Per Cent. of " Utilization
		Maximum Days Care	Actual Days Care	
1. Irvington House	70	26,280	20,273	79%
2. Martine Farm	24	8,760	8,809	100.3%
3. Mary Zinn	41	14,565	13,680	91%
4. Nichols Cottage	6	2,282	2,234	98%
5. Pelham Home	30	10,950	9,809	90%

Special Convalescent Homes—Children Orthopaedic

Name of Home	Bed Capacity	Days Care in a Year		Per Cent. of " Utilization
		Maximum Days Care	Actual Days Care	
1. *****Blythedale Home	60	12,720	11,284	88%
2. Brooklyn C. A. S. Wavecrest	} 37 W. 60 S.	15,931	13,131	82%
3. Robin's Nest		7,776	5,376	69%

Notes: " An average annual utilization of 90% connotes full utilization.
W. means winter capacity.
S. means summer capacity.
shows a cross reference.
* and ***** indicates a seven months' utilization, per cent. worked out on that basis.
** , *** and **** indicate a ten months' utilization, per cent. worked out on that basis.
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Camden, N. J., Author, 1928. 125 p.
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25. ed. Lond., Butterworth, 1927-8. 681 p.
- Winter, G. Lehrbuch der operativen Geburtshilfe.
Berlin, Urban. 1927. 475 p.
-

FELLOWS ELECTED MARCH 1, 1928

Frederick McKelvey Bell, M.D.....	S15 Park Ave.
Alice Rheinstein Bernheim, M.D.....	148 West 86th St.
Austin Walter Cheever, M.D.	
	472 Commonwealth Ave., Boston
Angus Macdonald Frantz, M.D.....	1192 Park Ave.
Virginia Kneeland Frantz, M.D.....	1192 Park Ave.
Rubin Abram Gerber, M.D.....	30 East 58th St.
Edwin Toal Hauser, M.D.....	903 Lexington Ave.
Robert H. Hutchinson, Jr., M.D.....	515 West 110th St.
Paul Klemperer, M.D.....	378 Central Park West
Arthur B. McGraw, M.D....	Grosse Pointe Village, Mich.
Alexander T. Martin, M.D.....	114 East 54th St.
Ben-Henry Rose, M.D.....	229 E. Kingsbridge Road
Irving Simons, M.D.....	30 East 40th St.
Walter Stenson, M.D.....	45 East 85th St.
Percy R. Vessie, M.D.....	Greenwich, Connecticut

 DR. ROBERT ABBE

Dr. Robert Abbe was born on April 13, 1851, in New York City, the son of George Waldo and Charlotte Colgate Abbe. He was educated in the public schools of New York and graduated from the College of the City of New York in 1870. Prior to undertaking his medical courses he was an instructor at the College of the City of New York for two years, in drawing, English and geometry. Dr. Abbe pursued his medical studies at the College of Physicians and Surgeon in New York City and was under the preceptorship of Dr. James L. Little. He graduated in 1874, and for his thesis wrote on the Sarcina Ventriculi. After an internship at St. Luke's Hospital, Dr. Abbe took up the practice of medicine with a special leaning toward surgery, which he subsequently developed as his chosen field of work. He was a Fellow of the American Medical Association, a Fellow of the American College of Surgeons, a member of the American Physicians and Surgeons



DR. ROBERT ABBE

Society, a member of the American Surgical Society, of the International Surgical Society, the Pathological Society, the Surgical Society and he was also a member of the Society of Alumni of St. Luke's Hospital. He was attending surgeon at the Out-Patient Department of the New York Hospital and subsequently attending surgeon to the Hospital. He was also attending surgeon at St. Luke's, the New York Skin and Cancer, the New York Babies' Hospitals, and was later consulting surgeon to Woman's Hospital, the Hospital for Rupture and Crippled and Roosevelt Hospital. Dr. Abbe rendered service as a teacher of surgery at the Woman's Medical College, at the Post Graduate Medical School and Hospital and was also lecturer at the College of Physicians and Surgeons, Columbia University. Dr. Abbe was one of the first surgeons in this city to perform an intestinal anastomosis and was also one of the first to make use of radium in the treatment of cancer. He was a generous contributor to medical literature on surgical subjects, and in particular in the field of spinal surgery, abdominal surgery and malignant tumors. Dr. Abbe was elected a Fellow of the Academy in 1883 and in 1900 he delivered the Anniversary Discourse. He was vice-president of the Academy from 1906 to 1908 inclusive. Dr. Abbe died on March 7, 1928, after a lingering illness, and his passing marks the departure of one of the prominent surgeons of the past generation, whose work contributed so largely to the development of surgery in New York City.

CHARLES L. DANA.

The character and career of the late Dr. Robert Abbe have been set forth with great truth and eloquence in a tribute to him which appeared in the *New York Times* of March 8, 1928. One can add little to its appropriateness and verity, but a friend of his, like myself, feels the desire to express his personal reactions to Abbe's character and deeds.

Dr. Abbe had a most stimulating personality. He admired with a great deal of frankness the work, the accomplishments and social qualities of his friends. I doubt if he ever harbored any hate,—I never heard him speak unkindly of anyone. He saw all things of human interest and professional importance in a roseate light of fine approval and enjoyment. The world was a beaming spot to him. While he warmly praised and actively helped the work and aspirations of others, he also greatly enjoyed and appreciated with inoffensive charm, any modest tributes to himself. He was surgically inventive and extraordinarily skillful in his surgical technique. He was an artist in surgery and also in all forms of manipulative skill; he was a good painter and a moulder of fine sculptural work.

His activity in his later years as a maker of raised topographical maps was unique and original. To the last Dr. Abbe worked along these lines and found great comfort in what he so beautifully and usefully accomplished.

There was something different, something stimulating, euphonic and appealing in Abbe's character which ever showed itself in his helpful and hope-abounding temperament. His personality gave to his patients as much help as his surgery—a thing of a masterly grade.

It would be a most pleasing thing to him if he could now know that his friends and his public consider him worthy of an "*eternum decus in stellis*" by reason of his inspiring personality, of the purity and sanity of his life, and on account of the practical accomplishments, human and technical, of his long and busy career.

DEATH NOTICE

MAX GUSTAV SCHLAPP, M.D., 121 East 60th Street, New York City; graduated in medicine from Berlin University, Berlin, Germany, in 1896; elected a Fellow of the Academy, April 7, 1904; died, March 5, 1928. Dr. Schlapp was a Fellow of the American Medical Association, a member of the American Pathological and Bacteriological Society, the Neurological Society, the Pathological Society, and the Neuro-Pathological Society, Post Graduate Hospital.

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VOL. IV.

MAY, 1928

No. 5

EDITORIAL
AVAILABLE SOURCES AND FUTURE PROSPECTS
OF MEDICAL BIOGRAPHY¹

The historical records of our profession are assembled first, from the secular histories of nations, from governmental and municipal records, from extant medical texts, from bibliographies of such texts, from tradition and hearsay, and finally from medical biography. To physicians, medical biography is one of the best modes of preserving historical data and the most simple and direct line of approach to medical history. Biographies of physicians have to be assembled from tradition, from family records, from government records, from inscriptions on tombstones or memorial tablets, from collateral references in secular literature, from the writings of physicians themselves, from bibliographies of the same and from the chronological data in books on secular and medical history. Hirsch points out that the historian must convey the essential spirit or *cachet* of a period, the ideas and social forces which activated it, while biography is individual, local and personal. Medical biography was personal up to the time of Haller, who, about 1774-5, introduced a new element, the bibliographical. Materials for constructing biographies of outstanding physicians have existed from the beginnings of recorded history but have seldom been intelligently employed, for the self-evident reason that only a limited number of people, even among professional men of letters, have any specific talent for biography, in the sense of a definite evocation of personality, character and

¹ Read at a meeting of the Book and Journal Club, Baltimore, on March 8, 1928.

achievement in relation to time and place. The general recipe for all such work is contained in the dictum of Verneuil: "While erudition creates nothing, it may lead to creation," which may be bent to our present purpose by saying that the object of erudition is to furnish building stones for construction. For biography is in danger when it attempts to invade the great field of creative and imaginative literature. If it is to be of any permanent value, it must avoid romancing, and deal, like history, with ascertained or ascertainable fact. Plutarch's *Lives*, Boswell's *Johnson*, Carlyle's *Frederick* are not in the same class with *Hamlet*, *Don Quixote* and *Faust*; nevertheless, Boswell does make us see and feel *Johnson*, Carlyle does make us understand *Frederick*, without drawing upon the imagination or telling any lies about them. Of the earliest known physician, Im-hotep in Egypt (2900 B. C.), two admirable biographies have appeared within the last quarter-century, those of Kurt Sethe in Germany (1912) and of J. B. Hurry in England (1925). Constructed, as they have been, from shreds and patches, they cannot, in the nature of things, convey the impression of a vitalized, understandable personality, but they do convey all the information at present available. Georg Ebers, in *Uarda*, did better, but that is fiction, like Landor's *Pericles and Aspasia*. Some evocation of this kind has been attempted in Johannes Ilberg's cultural picture *Aus Galen's Praxis* (1905) and in Meyer-Steineg's *A Day in the Life of Galen* (1913). Pieced together from hundreds of sources, these mosaic pictures may be viewed in the light of Carlyle's criticism of Zimmermann's *Day with Frederick the Great*: "Very flat, but I daresay very true:—a Daguerrotype of One of his Days."

Lists of ancient physicians may be constructed from the *Prooemium* of Celsus, from Oribasius, from the *chapitre singulier* of Guy's *Chirurgia magna* (1363), which was separately printed by Etienne Dolet (1542), from Symphorien Champier's history of medicine (*De claris medicinarum scriptoribus*, Lyons, 1506), which is really biographical, from Brunfels' *Catalogus illustrium medicorum*

(Strassburg, 1530), and from the biographical collections of Pierre du Chastel (Antwerp, 1618), Linden (1637) and *Linden renovatus* (1686). Apart from Menon's and *Iatrika*, the earliest known collection of biographies of physicians is that of Useibia of Damascus (1203-69), the Latin (MS.) translation of which (by Reiske of Copenhagen) has been lost, but which was partly translated into French by J. B. Sanguinetti in the *Journal asiatique* (1854-6). Of sources of this kind, Hirsch, in 1884, listed no less than 440, which he has further classified by countries, by historic periods and by specialties. To-day, we could probably double the number of titles in Hirsch's list, but, for ready reference in medical libraries, we still rely mainly upon a few available war-horses, notably:

- N.-F.-J. Eloy: *Dictionnaire historique de la médecine*. 2 v. Liège, 1755.
 2. ed. 4 v. Mons, 1778.
 Bayle & Thillaye: *Biographie médicale*, 2. v. Paris, 1855.
 Callisen (A. C. P.): *Medicinisches Schriftsteller-Lexikon der jetzt lebenden Aerzte*, 30 v. Copenhagen, 1830-45.
 Jourdain (A.-J.-L.): *Biographie médicale*, 7 v. Paris, 1820-25 (being the initial volumes (1-7) of his *Dictionnaire des sciences médicales*).
 Dechambre (A.): *Dictionnaire encyclopédique des sciences médicales*. 100 v. Paris, 1864-90, from which are derived many of the biographical sketches in
 Hirsch (August): *Biographisches Lexikon der hervorragenden Aerzte*. 6 v. Wien & Leipzig, 1884-8. Later, supplemented by
 Pagel (Julius): *Biographisches Lexikon*, Berlin & Wien, 1901.
 For references, the bibliographies of Haller (1771-88) and the three series of the Index Catalogue of Surgeon General's Library, Washington, 1880-1928.

Of the above, Bayle and Thillaye (1855), although alphabetized only in the index, is the handiest of all, and was always on Osler's desk; Jourdain is unsurpassable for thoroughgoing and accurate bibliographies of the writings of physicians up to the 19th century, and was a constant *rude mecum* with Billings in the matter of filling up lacunae in the author bibliographies of the Index Catalogue; Callisen is indispensable for the period following the French Revolution; Dechambre and Hirsch cover the later period very adequately, and Pagel the physicians who were alive and prominent at the beginning of the 20th century. Of the legions of physicians in all countries who have par-

ticipated in the concerted advancement of medicine in the first quarter of the 20th century, there is no biographical index whatever. Supplementing Hirsch's list by some more recent references,¹ the collateral sources may be arranged as follows:

ANCIENT (GREEK AND ROMAN) PHYSICIANS

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 Dansk biografisk Lexikon. Udg. af C. F. Bricka. 19 v. Copenhagen, 1887-1905.
 Denske (Den) Lægestand. 1907-15. (9. ed. of Carøe). Copenhagen, 1915.
 Ersley (T. J.): *Almindeligt Forfatter-Lexicon for Kongeriget Danmark*. 3 v. Copenhagen, 1843-53. Supplement, 3 v. Copenhagen, 1858-68.
 Gratschhoff (Louis): *Finlands Läkare*. Marienhamm, 1900.
 Halvorsen (J. B.): *Norsk Forfatter-Lexikon* (1814-80) 6 v. Christiania, 1885-1908.
 Hofberg (H.): *Svenkst biografiskt handlexicon*. 2 v. Stockholm, 1876.
 Ingerslev (V.): *Danmarks Læger og Lægevesen* (up to 1800). 2 v. Copenhagen, 1873.
 Kiær (F.): *Norges Læger i det nittende Aarhundrede* (1800-71), Christiania, 1873. Continuation: Christiania, 1887.
 Kobro (I.): *Norges Læger*: 1800-98. 2 v. Kristiania, 1915.
 Kraft (J. E.): *Norsk Forfatter-Lexikon* (1814-56). Christiania, 1863.
 Laache (S. B.): *Norsk medicin i hundrede Aar*. Kristiania, 1911.
 Lennmalm: *Svenska Läkaresällskapets Historia*. 1808-1908. Stockholm, 1908.
 Lillja (J. W.): *Bibliographia hodierna Fenniae*. 3 v. Åbo, 1846-59.
 Linnström (H.): *Svenskt Boklexicon*. 1830-65, Stockholm, 1863.
 Nielsen (L.): *Dansk Bibliografi* (1482-1550). Copenhagen, 1919.
 Nyerup (R.) & Kraft (J. E.): *Almindeligt Litteraturlæxicon*. Copenhagen, 1820.
 Sacklén (J. F.): *Sveriges Läkare-Historia*. 4 pts. Nyköping, 1822-35.
 ——— Continuation by Wistrand, Hilarion [*et al.*]. Stockholm 1853-76.
 Winther (M.): *Bibliotheca Danorum medica* (up to 1832). Copenhagen, 1832.
 Worm (J.): *Försög til et Lexicon*. 3 pts. Helsingfors, 1771-84.

SPANISH PHYSICIANS

- Anuario medico de España. v. 1. Madrid, 1927.
 Chinchilla (A.): *Anales historicos de la medicina*. 4 v. Valencia, 1841-48.
 Morejon (A. H.): *Historia bibliografica de la medicina española*. 7 v. Madrid, 1842-52.
 Ovilo y Otero (M.): *Enciclopedia hispano-americana*, v. 1, Paris, 1859.

SWISS PHYSICIANS AND SOURCES

- Gesner (C.): *Bibliotheca universalis*. 3 v. Zürich, 1545-55.
 von Haller (A.): *Bibliotheca botanica*. Zürich, 1771-2. *Bibliotheca anatomica*. Zürich, 1774-7. *Bibliotheca chirurgica*. Bern, 1774-7. *Bibliotheca medicinae practicae*. Basel, 1776-8.

- Lutz (M.): Nekrolog denkwürdiger Schweizer aus dem 18ten Jahrhundert. Aarau, 1812.
- Moderne Biographien. Lichtensteig, 1826.
- Schweizerischer Litteratur-Kalender. Hrsg. von Victor Harding. v. 1. Zürich, 1883.
- Schweizerischer Schriftsteller-Lexikon. Hrsg. von Hermann Aellen. Wein-felden, 1918.
- Secretan (E.): Gallérie suisse. Biographies nationales. 3 v. Lausanne, 1873-80.
- Wolf (R.): Biographien zur Kulturgeschichte der Schweiz. 4 v. Zürich, 1858-62.

Thus far, we have considered mainly the raw material of medical biography, the source-books to which we must go in order to construct the plainest, barest outline of a given physician's life. Let us register a debt of gratitude to those who have done something more than this, to Eloy, Bayle, Thillaye, Jourdain, Callisen, Dechambre, Hirsch, Pagel and Billings, whose devitalizing labors were sometimes accomplished under conditions of great difficulty and privation, enduring work, not done for show, but on the principle of *aliis inserviando consumor*, or, as Sainte Beuve expressed it, *mais en étouffant ma flamme*. The immense value of the sources listed by Hirsch is perhaps best appreciated in the Surgeon General's Library, where, in preparing the author-bibliographies for the Index Catalogue, the bibliographer must personally identify each item as the *bona fide* work of the given author and affix the dates of his birth and death (if accessible), to the initial entry. To carry on this work, the bibliographer must have a goodly number of these source-books around and about him, and here lists of physicians, well executed bibliographies of periods, nations or subjects, catalogues of articles indexed in periodicals and general biographical dictionaries are all helpful. Let us suppose, for instance, that he has a large number of medical pamphlets assigned to some very common surname, without a given name, *e.g.*, to "Doctors" belonging to the great Smith, Brown, Jones, Robinson, Mayer, Meyer, Miller, Müller, du Bois, Du Bois, or Dubois families. He must first locate some collateral clues to the writer's identity, *e.g.*, the city or hospital in which he practised, the place of publication, lists of his

other published works, if given on a flyleaf, or some internal evidence in the text.¹ If his native city or home town is known, one proceeds at once to such sources as the medical registers of the physician's country to ascertain, if possible, his probable given name or the date of his graduation. With this information in hand, it is comparatively easy to ascertain his full name and date of birth from his graduating dissertation, if he is a German, a Frenchman or a Russian. Failing this, one must cast about to some purpose in the French *Annales*, the *Börner Reichs-Medizinal-Kalender* or some other of the source-books listed, if anything positive is to be gleaned about him. Work of this kind requires great mental concentration. A bundle of French medical pamphlets under one common surname may require a full day's labor before they can be allocated to the proper authors, and sometimes even the merest straw will be all the searcher has to show which way the wind blows. If the book or pamphlet is undated, he must resort to the newer catalogues of incunabula, to Haller, Callisen, the Royal Society Catalogue of periodical contributions indexed by authors (1800-1900), the Index Catalogue or the Index Medicus. If the pamphlet is anonymous or pseudonymous, he must resort to the catalogues of literature of veiled authorship (*anonyma* and *pseudonyma*), of which Schneider gives a long list, *e.g.*,

INTERNATIONAL

- Franklin (Alfred): *Dictionnaire de noms, surnoms, et pseudonymes latins de l'histoire littéraire du moyen âge (1100-1530)*. 2. ed. Paris, 1879.
 Geisler (Friedrich): *Disputatio de nominum mutatione et anonymis scriptoribus*. Lipsiae, 1669.
 Placcius (Vincentius): *Theatrum anonymorum et pseudonymorum*. Hamburgi, 1708.
 Weller (Emil): *Lexicon pseudonymorum*. Wörterbuch der Pseudonymen aller Zeiten und Völker. 2. vermehrte Aufl. Regensburg, 1886.

BELGIAN

- Delecour (Jules): *Dictionnaire des ouvrages anonymes et pseudonymes publiés en Belgique au 19. siècle*. Bruxelles, 1863-66.

¹ In editing indexed articles for the Cumulative Quarterly Index Medicus (Chicago), identification is established by supplying the full given name, if available, as well as the city or institution in which the given author is active at the time.

² G. Schneider: *Handbuch der Bibliographie*. Leipzig, 1923.

DUTCH

- van Doorninck (Jan Izaak): *Vermomde en naamlooze schrijvers der Nederlandsche en Vlaamsche letteren*. 2. ed. 2 v. Leiden, 1883-85.
- *Bibliotheek van Nederlandsche anonymen en pseudonymen*. 's Gravenhage & Utrecht [n.d.].
- de La Montagne (Victor Alexandre): *Vlaamsche pseudoniemen*. Roesselare, 1884.

ENGLISH AND AMERICAN

- Cushing (William): *Initials and Pseudonyms*. 1.-2. series. London, 1886-88.
- *Anonyms. A Dictionary of Revealed Authorship*. Vol. 1. 2. London, 1890.
- Halkett (Samuel) & Laing (John): *A Dictionary of the Anonymous and Pseudonymous Literature of Great-Britain*. v. 1-4. Edinburgh, 1882-88.
- *The same, new and enlarged*. Ed. by James Kennedy, W. A. Smith & A. F. Johnson. v. 1-2. A.-G. Edinburgh, 1926.
- Hamst (Olphar) [i. e. Ralph Thomas]: *Handbook for Fictitious Names*. London, 1868.
- Marchmont (Frederick): *A Concise Handbook of Ancient and Modern Literature, issued either anonymously, under pseudonyms or initials*. London, 1896.
- Stonehill (C. A.), Block (A.) & Winthrop-Stonehill (H.): *Anonyma and Pseudonyma*. 4 v. London, 1926-27.

FRENCH

- Barbier (A. A.): *Dictionnaire des ouvrages anonymes*. 3. éd. (Olivier Barbier, René et Paul Billard). 4 v. Paris, 1872-89.
- Brunet (G.): *Dictionnaire des ouvrages anonymes suivi des supercheres littéraires dévoilés*. (Ed. Daffis). Paris, 1889.
- De Manna (E.): *Nouveau dictionnaire des ouvrages anonymes et pseudonymes*. Nouvelle éd. Lyon, 1862.
- Quérard (J. M.): *Les supercheres littéraires dévoilés*. 2. éd. (Gustave Brunet et Pierre Jannet) suivie. 1. du *Dictionnaire des ouvrages anonymes par Antoine Alexandre Barbier*. 3. éd.; 2. d'une table générale des noms réels. 7 v. Paris, 1869-79.

GERMAN

- Holzmann (Michael) & Bonatta (Hanns): *Deutsches Pseudonymen-Lexikon*. Wien & Leipzig, 1906.
- *Deutsches Anonymen-Lexikon*. 6 v. Weimar, 1902-11.

ITALIAN

- Melzi: *Dizionario di opere anonime e pseudonime di scrittori italiani*. 3 v. Milano, 1848-59.
- Montarolo (G. B.): *Bibliografia del risorgimento italiano: Opere anonime e pseudonime*. Roma, 1884.
- Passano (G.): *Dizionario di opere anonime e pseudonime*. Ancona, 1887.
- Rocco (E.): *Anonimi e pseudonimi italiani*. Napoli, 1888.

SCANDINAVIAN

- Bygdén (Anders Leonard): *Svenskt anonym-och pseudonym-lexikon*. 2 v. & Supplement. Upsala, 1898-1915.

Collin (Edgar): *Anonymer og Pseudonymer i den danske, norske og islandske Literatur*. Kjobenhavn, 1869.

Pettersen (Hjalmar): *Anonymer og Pseudonymer i den danske, norske Literatur 1678-1890*. Kristiania, 1890.

SLAVIC

[Dabeczńska-Budzynowska] (Helena): *Pseudonimy pisarzy polskich*. Zebrał H. D. Lwów, 1910.

Dolensky (A.): *Slovník pseudonymu v české a slovenské literaturě*. 2. vyd. (V Praze, 1910).

Gennadi (G. N.): *Spisok anonykh russkikh knig*. S.-Peterburg, 1874.

Karcov (V. S.) & Maznev (M. N.): *Opyt slovarja psevdonomov russkikh pisatelej*. S.-Peterburg, 1891.

Pseudonimy i cryptonimy pisarzów polskich zebrata J. Z. Warszawa, 1905.

SPANISH

Barros Arana (Diego): *Notas para una bibliografía de obras anonimas i pseudonimas sobre la historia, la geografía e la literatura de America*. Santiago de Chile, 1882.

Da Fonseca (Martinho Augusto): *Subsidios para um dicionario de pseudonymos, inicias e obras anonymas de escriptores portuguezes*. Lisbon, 1896.

Maxiriath: *Unos cuantos seudónimos de escritores españoles*. Ed. corr. Madrid, 1901.

If so much labor is required to straighten out the minor and less known works of a given author, how much greater must be the toil necessary to construct the outlines of his life history, where no biographical records are available. For the older writers, Sudhoff regards work of this kind as of the utmost importance; and to ascertain a single date correctly as of far greater moment than (say) some jubilant rehashing of the life-history of an already well-recorded physician. To-day, with so many willing hands available, outstanding physicians are very well taken care of in this regard.* On the continent, a physician, who is prominent or eminent, may acquire ten or twenty obituary

* A remarkable exception was Emil Noeggerath (1827-1895), who, for many years after his death, was commemorated by seven lines in an obscure corner of Virchow's *Archiv* (1896, cxiii, 680) and has only just received adequate biographical notice at the hands of Paul Diepgen (*Klin. Wochenscher*. Berl., 1927, vii, 1926), H. S. Reichle (*Ann. Med. Hist.*, N. Y., 1928, xi, 770-79) "for his centenary." Yet he was, with Jacobi, a founder of the *American Journal of Obstetrics* (1868) and through his doctrine of latent gonorrhœa (1872), which brought him much obloquy, he is now almost coequal and coeval with Semmelweis as one of the great benefactors of womankind.

notices after death or even a full bibliography of his writings. Pavloff, indeed, when the *canard* about his demise was circulated in 1916, enjoyed the unique distinction of reading full-length (and withal laudatory) obituary notices of himself, in the *British Medical Journal*, the *Lancet* and *Nature*. What has been written about Charcot and Osler would, if collected, make portly volumes. Judging by their facility in multifarious contributions to scientific literature, some of our illustrious contemporaries seem to have labored with a single eye to the sardonic dictum of Schopenhauer: *Das Leben ist ein Pensum zum Arbeiten: daher ist defunctus ein schöner Ausdruck.*" This brings us to the more attractive phase of the subject, namely the finished medical biography, the kind which is eminently readable as a literary production. The best are those of:

Arbuthnot by G. A. Aitken (1892); Claude Bernard by Sir Michael Foster (1899); Beaumont by Jesse Myer (1922); Bretonneau (1892), Larrey (1902) and Recamier (1899) by Paul Triaire; Caius by John Venn (1912); Jerome Cardan by Henry Morley (1854); Daniel Drake by Otto Juettner (1909); Fothergill by Hingston Fox (1919); Sir Francis Galton by Karl Pearson (1914-24); John Hunter (1897), Victor Horsley (1919), Paget (1901) and Paré (1897) by Stephen Paget; Helmholtz by Leo Koenigsberger (1902); Huxley by Leonard Huxley (1900); Robert Knox by H. Lonsdale (1870); Linacre by Sir William Osler (1908); Linnaeus by B. D. Jackson (1923); Lister by Sir Rickman Godlee (1918); Manson by P. H. Manson-Bahr (1927); Johannes Müller by Wilhelm Haberling (1928); Osler by Harvey Cushing (1925); Pasteur by Vallery-Radot (1900); Radcliffe by J. B. Nias (1918); Walter Reed by Howard Kelly (1913); Théophraste Renaudot by Gilles de la Tourette (1884); Sydenham by J. F. Payne (1900); Vesalius by Moritz Roth (1892) and J. William White by Agnes Repplier (1919).

It is noticeable that most of these are of comparatively recent vintage, written indeed within the last 25 years. Some of them, such as Karl Pearson's Galton, Königsberger's Helmholtz or Cushing's Osler, are truly scientific biographies, in which all the data have been ascertained, assembled and organized with the utmost exactitude. Roth's Vesalius, published in 1892, was the pace-maker, a great sea mark of a book, every line and footnote of which implies hours of incessant labor and devotion. Note-

worthy, are such shorter essays in medical biography as M. Salomon's Baglivi (1889), W. S. Miller's Chovet (1911-27), Joseph Collins' Duchenne (1908), Marx's Herophilus (1838), Sainte Beuve's Littré (1863), Virchow's Jöhanneß Müller (1858), Strachey's Florence Nightingale (1918), Rowntree's Parkinson (1912), and the separate notices in Leslie Stephen's Dictionary of National Biography (London, 1885-1912), which in respect of accuracy as to dates and references, are perfect models of what such things should be. Another group comprises such arresting volumes of biographical essays as those of G. T. Bettany (1885), Sir Benjamin Ward Richardson (*Disciples of Aesculapius*, 1900), Osler (*An Alabama Student*, 1908), Victor Robinson (*Pathfinders*, 1912), John Ruhräh (*Pediatrics of the Past*, 1925) and Hemmeter (*Master Minds of Medicine*, 1927). Of necessarily looser texture are the autobiographies of remarkable physicians, of which one might make a formidable list, notably those of

Arlt (1887), von Baer (1865), Moritz Benedikt (1906), von Bergmann (1886-1906), Billroth (1894), Boerhaave (1743), Burdach (1848), S. C. Busey (1896), Charles Caldwell (1855), Sir C. A. Cameron (1920), Jerome Cardan (*De vita propria*, 1663), Jean de Carro (1855), George Cheyne (1743), Sir Robert Christison (1885-6), Ferdinand Cohn (1901), Hermann Cohn (1897), Sir William MacCormac (1884), Johann Dietz (1915), Donders (1889), E. C. Dudley (*The Medicine Man*, 1926), Wilhelm Ebstein (1900), Georg Fischer (1921), Johann Peter Frank (1802), W. A. Freund (1913), Gegenbaur (1901), A. G. Gerster (1917), S. D. Gross (1887), Helmholtz (1891), the elder His (1903), Sir Henry Holland (1872), J. F. Horner (of Horner's triad, 1887), Hufeland (1896), Huxley (1891), Jung-Stilling (1777-1817), Javal (1901), Justinus Kerner (1849), E. H. Kisch (1914), Koelliker (1899), Franz Koenig (1912), Kussmaul (1899-1903), Lettsom (1817), Leyden (1910), Linnaeus (1826), Lorinser (1864), Malpighi (*Opera posthuma*, 1697), Alfred Meissner (1884), Moleschött (1894), Naunyn (1925), Pagenstecher (1913), C. H. Pfaff (1854), L. S. Pilcher (1925), Pirogoff (1894), Felix Platter (1840-66, 1878-1913), Henry Power (1912), Sir B. W. Richardson (*Vita medica*, 1897), Sir Ronald Ross (1923), C. L. Schleich (*Besonnte Vergangenheit*, 1921), J. H. Schulze (1743), Sir Felix Semon (1926), Marion Sims (1884), Robert Sommer (1922), Stromeyer (1875), Strümpell (1925), Trendelenburg (1924), Tschirch (1921), Victor C. Vaughan (1926), Carl Vogt (1845), Waldeyer (1921), Sir Hermann Weber (1919), M. A. Weikard (1784), Wiedersheim (1919), Winslow (1912), and Wundt (1920).

A recent serial devoted to the publication of brief autobiographies of German physicians (*Die Medizin der Gegenwart in Selbstdarstellungen*, 1923-7) is now in its seventh volume (1928). It will be evident from such indications as these, that biographically speaking, present day physicians are either well taken care of or well able to take care of themselves. The selection of a likely biographer by a physician and the composition of the biography during his lifetime is a process not unknown to medicine. But what of biographical dictionaries of physicians of the reliable type of Jourdain or Hirsch, which are so sorely needed for the twentieth century men? who will be the Hirsch or the Pagel of the future? The prospects are by no means as alluring nor as easy of realization as might appear. Living as we do, in a transition period, a period as yet devoid of definite tendency, the proliferation of medical literature alone since the war, apart from the present gigantic literature of general biology, is a phenomenon which may well give us pause—

"Perplexing the bravest
With doubt and misgiving."¹

It is said, for instance, that some 6000 periodicals are drawn upon annually for the publication "Biological Abstracts," while the number of new institutions devoted to biology and medicine which have sprung up recently in European cities is unparalleled outside of Soviet Russia. Where Leningrad has three separate Medical Institutes along with an Institute of Experimental Medicine, a Psycho-Neurological Academy, a Psycho-Therapeutic Institute, an Institute of Röntgenology and Radiology, a State Physico-Technical Röntgen Institute, Moscow has two state universities, a Communistic Sverdlov University, a Communistic University for National Minorities in the West, a Stalin University for Oriental Activities, a Sun Yat Sen University for Chinese Students, Institutes for Nutritional Physiology, Tropical Diseases, Microbiology, Endocrinology, Venereology, Social Hygiene, not to mention the Ethnopark, the Giant Magnet and the Zoopark. There

¹ Goethe: *Trancrlogc*. Carlyle's translation.

are four separate universities in Prague (for Czechs, Germans, Russians and Ukrainians), a Central Institute for Investigating the Brain and a Society for Racial Hygiene at Graz (Styria), a Society for Elucidating the Mystery of the Divining Rod (*zur Klärung der Wünschelrutenfrage*) in Munich, a Kolloid-Gesellschaft in Leipzig, an Institute for Investigating Albumens in Heidelberg, an Institute of Mycology and a Phonetic Laboratory in Hamburg, a Laboratory of Vegetable Biology at Fontainebleau, a Society for the Study of Physiognomy in Berlin, archaeological museums all over the old Ægean and Ionian regions, with ephors in charge, and even an Instituto Biologico (1922) at Guadalajara (Mexico). More appalling still, the majority of these institutions and societies are in the way of publishing monographs and transactions. Most of them, it is true, are post-bellum foundations and some may turn out to be mushroom growths. But the Paris Conservatoire (1795) and some other French experiments of the post-Revolutionary period are now flourishing, stabilized institutions. On the other hand, the Hermitage, founded by the great Catherine in 1765, weathered the Revolution of 1917 and is still the finest collection of paintings in Europe. The difficulty with the proliferations following the European War is that their output, like some vast inundation over a broken dam, is beyond the control of librarians and bibliographers. To keep track of the identities, full names and dates of birth of the gigantic personnel implicit in these developments would be an even more momentous task. Some years ago, Dr. Howard Kelly (Baltimore), as well as Professor Karl Sudhoff (Leipzig), entertained the idea of a General (International) Dictionary of Medical Biography, to be carried forward by international cooperation, but the difficulties of financing and organizing such an enterprise seem unsurmountable. It implies virtual whole-time labor on the part of a definite number of expert physicians, most of whom (if available) could not afford to desert their livelihood for such work. Apart from Dr. Kelly's Cyclopedia, American physicians will be well taken care

of in the *Dictionary of American Biography*, now edited by Professor Allen Johnson under the auspices of the American Council of Learned Societies (Washington), albeit a rigid (and withal very sensible) system of exclusion is applied to names not distinguished for any outstanding achievement. For the composition of biographical notices of physicians for an international dictionary of this kind, Gurlt (in the last volume of Hirsch, 1888) gives the following effective rules:

A. Personal Data. Given name (in full). Authentic dates of birth and death (days of month, if possible). Dates of important events in subject's life (year only). Name of father only when a physician, or otherwise prominent or eminent (applicable also to mother or other relatives). Schooling, if of consequence. University and medical training (dates of graduation), with medical teachers, if outstanding, significant or founders of a school of thought. Medical travels (dates). University chairs, public positions and honors (dates). Prizes, membership in important societies, orders. Important activities other than medical. Personal characteristics (only for the most eminent of the past and never for the living).

B. Bibliography, Graduating theses (Inaugural and Concours) if important. Books, pamphlets and contributions to periodicals (only those which have exerted a decisive influence upon science or are otherwise outstanding), with dates. References only when valuable or important.

C. Sources. Biographical and bibliographical sources can be indicated at end with utmost brevity and perspicuity.

In the *Dictionary of American Biography*, more attention is paid to genealogy and personal traits, but brevity is insured by allotment of a definite number of words, while rigorous authentication of facts and dates is essential. It is highly probable that the different nations will, in time, give a good account of themselves in similar productions, but the composition of an *International Dictionary of Medical Biography* of the quality of Leslie Stephen's *Dictionary of National Biography* is a problem so hazardous that it provokes all the inertia and fear of the untried which is one of the most salient traits of the human mind. The most effective solution to date is in such compilations as the *Deutscher Gelehrten-Kalender* (Kürschner, 1926), which gives the effective scientific achievements of contemporary workers, with dates, or the

Biographisches Jahrbuch. Some of the functions of these might be well taken over by the various Who's Whos which abound at the present time. Should any group of physicians be in position to make essay of the more difficult and hazardous enterprise, they will find their work cut out for them in the lists supplied above.

F. H. GARRISON.

PAPERS DELIVERED AT STATED MEETINGS

Symposium on Graduate Medical Education
January 19, 1928

I.

TWELVE YEARS' EXPERIENCE OF THE UNIVERSITY OF MINNESOTA IN GRADUATE MEDICAL EDUCATION

LOUIS B. WILSON

Director of The Mayo Foundation
Rochester, Minnesota

HISTORICAL

For several years prior to 1915 the University of Minnesota in common with other universities had been offering graduate work in the basic medical sciences. In 1914 it began graduate work in various fields of clinical medicine and surgery.

At the Mayo Clinic at Rochester, Minnesota, the training of medical graduates for special work in pathology, clinical medicine and surgery, by means of internships, residencies and assistantships in connection with research work in the laboratories, had been developed until in 1912 regular three-year courses were in operation.

On June 9, 1915, the University of Minnesota and the Mayo Foundation for Medical Education and Research, through the leadership of Mr. George H. Vincent, then President of the University of Minnesota, and Dr. W. J. Mayo of the Mayo Clinic, entered into an agreement by the terms of which the funds and income of the Mayo Foundation should be devoted, under the direction of the Board of Regents of the University of Minnesota, to the promotion of graduate medical education and research. After a year and a quarter trial period the funds and income of the Mayo Foundation were, in September, 1917, transferred entirely to the Regents of the University. Thus

the Mayo Foundation became an integral part of the University of Minnesota, controlled entirely by that body. At the same time the Mayo Clinic entered into an agreement with the University of Minnesota whereby it agreed to furnish to the University the free use, for teaching and research, of all its clinical material, laboratories, museums, library and such offices as might be used, by the Mayo Foundation. On this basis for more than twelve years, the University of Minnesota has conducted graduate work in medical education and research in the Mayo Foundation at Rochester, Minnesota, as well as in its medical school in Minneapolis, Minnesota.

ORGANIZATION

The entire graduate work in medicine at the University of Minnesota is made a part of the general Graduate School. Its management is vested by the Board of Regents in a Committee consisting of: the President of the University, the Dean of the Graduate School, the Dean of the Medical School, the Director of the Mayo Foundation, four appointed members of the Faculty from the Medical School, and four appointed members of the Faculty from the Mayo Foundation. This Board is divided into a Medical School Section and a Mayo Foundation Section, each of which holds frequent stated meetings and has a large degree of autonomy in its own affairs. Quarterly meetings of the entire Board are held where all the work of each section, since the preceding meeting, is reviewed, and all general policies-affecting both sections of the school are discussed and recommendations thereon made to the President of the University.

RESOURCES (FINANCIAL)

Graduate work in the Medical School at the University is supported out of the general budget of the University principally by grants made biennially by the State Legislature.

The graduate and research work in the Mayo Foundation is supported by the income from the Mayo Founda-

tion Fund of somewhat over \$2,000,000, and in addition, since 1919, by the income from the Endowment Fund of the Mayo Clinic, which fund now somewhat exceeds \$8,000,000. The budget of the Mayo Foundation for the year ending June 30, 1927, was slightly over \$467,000.

RESOURCES (SCIENTIFIC)

The scientific resources of graduate medical work at the Medical School consist of all those educational facilities, used in part by the undergraduate medical students, and those at Rochester of facilities previously mentioned which are provided gratis by the Mayo Clinic. It should be noted, however, that besides the hospitals, clinical examining rooms, library and museum, there are now about 150 rooms used for laboratories at Rochester and of the staff of 132 physicians, physicists and chemists, eighteen are engaged wholly in research work and twenty-two in part-time laboratory research work. Most of the others are devoting a considerable portion of their time to clinical research. All the staff are on a "full-time" basis.

METHODS

Since the beginning of the graduate work in medicine at the University of Minnesota no attempt has been made to multiply opportunities for securing simply technical training through practitioners' courses.¹ Graduate work has been definitely planned to provide opportunities in three to five years of work for the well-prepared, serious-minded student to fit himself in the science as well as in the art of some special field, as in a basic medical science, or in clinical medicine or clinical surgery.

Graduate students have been selected on the basis of their superior qualifications, from a very large number of nominally qualified applicants. Thus during the past year

¹ The University through its Extension Department gives "Short Courses for General Practitioners" and through the Mayo Foundation "Clinical Weeks" in special fields, but these do not lead to graduate credit or "certificate" and are wholly unrelated to the graduate work under discussion here.

there were more than 1200 applicants for fellowships in the Mayo Foundation and of these less than 100 were accepted. There are at present about seventy men and women doing graduate work in medicine at the Medical School in Minneapolis and 287 in the Mayo Foundation.

In the Mayo Foundation there are no classes. There are during the year three lectures a week by members of the Faculty and an average of one lecture a week by some eminent authority outside the Faculty. Attendance at all these lectures is purely voluntary. Those given by the members of the Faculty are confined largely to a discussion of the newer advances in the various fields of medicine. Those by extramural lectures are of two types: First, a series each year on some topic of general interest in scientific fields closely related to medicine, as heredity, nutrition, or plant pathology. The second group consists usually of unrelated lectures determined by the selection of eminent men who can be induced to talk on topics of their greatest personal interest. A course, begun last year and which will continue for the next five years, consists of six lectures a year on special topics in the history of medicine.

These 200 lectures constitute almost everything in the nature of didactic teaching which is done in the Mayo Foundation. But the graduate students are working in close association with the members of the Faculty. The groups average a few more than two graduate students to one member of the Faculty. Their daily work, whether in research, routine laboratory, or routine clinical departments, is thus under the immediate personal supervision of staff members.

Perhaps the most important instruction aside from this daily supervision is in the seminars which are held in some sections every day and in most departments at least once a week. It should be noted, however, that these seminars are very informal and the students' opinions are expressed as freely as are those of the members of the Faculty. As a whole the seminars are most enthusiastic affairs.

APPOINTMENTS

The minimal length of appointment is for three years; the maximum is five years; the average length of residence is four years. The only exceptions to the minimal three-year-period of residencies are made to accommodate fellows, or members of teaching staffs of other universities or foundations, or of government services who are accepted for periods of six months or more.

STUDENT SUPPORT

In the Medical School most graduate students receive living stipends from appointments as teaching fellows in their major or minor fields; a few pay their own tuition and living expenses. In the Mayo Foundation all graduate students except those from other universities are on Foundation stipends. Fellows in the basic medical sciences receive stipends of \$900, \$1200, \$1500 a year, the first, second, third years respectively. Fellows majoring in clinical fields receive \$800, \$900, \$1000 for the first, second, third years respectively. Fellows in clinical research receive the stipend of fellows in basic sciences while they are engaged in research and the stipend of fellows in clinical fields while engaged in clinical work. In addition to the above most fellows receive appointments as first assistants either in their third or fourth years which give them \$1000 a year in addition to their regular stipend. A single man can live comfortably in Rochester on the minimum stipend paid in any field.

COURSES OF STUDY

While in the University Bulletin there is given a formidable list of detailed "courses" these are really only integral units for purposes of registration and evaluation of graduate credits. The student is requested to indicate before his acceptance only his major and minor fields of study. He is expected to put in a minimum of two years in his major field and a minimum of six months in his minor field. His minor field must be a basic medical science

and lend support to his major, which latter may be another basic science or a special clinical field.

For his first quarter's residence, unless he has indicated some other preference to the contrary, the fellow works in his minor field or in some non-clinical coördinate department. Before the end of his first quarter he is usually sufficiently oriented so that he is able to select intelligently his residence for the several succeeding quarters of his first three years.

The unit of residence in most departments is six months though in a few it is three months and in first assistantships it is one year. Each man is very conscientiously graded each quarter by the chief of the department in which he is studying. These grades furnish a guide to the Director of the Foundation in preparing the quarterly schedules of personnel and are the fundamental basis for determining priority in conflicting requests for the same service. As a result of their use each quarterly change of schedule, which concerns about one-half of the graduate men, provides about 75 to 80 per cent. of the graduate students with their first choice of work; 10 or 15 per cent. with their second choice, and the remaining 5 or 10 per cent. take work for which they did not ask but which is always in the line of their major field.

ADVANCED DEGREES

The following are the minimal requirements for recommendation to the Board of Regents for the degree of Master of Science with the field named, as Master of Science in Pathology, Master of Science in Surgery:

1. A minimal residence of two years in medical sciences, or three years in clinical fields.

2. No quarterly grade below *B* in the major field or below *C* in the minor field. Quarterly work graded below these points cannot be counted for residence.

3. The certification of all the members of the Faculty with whom the student has worked that in their opinion

he is competent to do good teaching or research in his major field if that major is a fundamental medical science or that he is competent to begin practice in a scientific manner without supervision in his major field if that major field is a clinical specialty.

4. The successful passing of a series of routine examinations in his major and minor fields. These examinations are designed to be, if possible, a little more difficult than those given in the same fields by any state or national board of medical examiners.

5. The unanimous approval of his thesis by a committee of five members of the Faculty. This thesis must embody the results of his personal study. It is not necessarily an elaborate piece of original research.

6. His recommendation by a jury, usually of eight or ten members of the Faculty, who review the record of his entire work in the university and give him a two-hour oral examination in the fields of his major and minor subjects. If the candidate is successful in his examination he is recommended by this jury to the Board of Regents to receive the degree of Master of Science in his major field.

7. For the degree of Doctor of Philosophy with field named, all the requirements used previously for the Master of Science must be met and in addition the candidate must have had a minimum of three years of residence, have passed thorough examinations in French and German, and submitted a thesis which embodies, as the result of his own research, a substantial contribution to the science of his major field.

In other words, the attempt has been made to insure the granting of the Master of Science degree only to those students who appear competent to do good teaching or research or thoroughly dependable clinical work in some special clinical field. The Doctor of Philosophy is reserved for those who in addition give evidence of decided ability in research.

SUMMARY OF REGISTRATIONS

Starting with an attendance of 79 graduate students in 1915 the number has gradually increased until at present there are 357 graduate students. The average number of graduate residents each year for the last five years ending June 30, 1927, was 297. Of these the average number in *basic sciences* was 65, distributed as follows: Anatomy, 18; Physiology or physiological chemistry, 18; Bacteriology, 13; Pathology, 13; Pharmacology, 3. The average number in *internal medicine and clinical medical specialties* was 104, distributed as follows: Internal medicine, 63; Pediatrics, 13; Dermatology, 7; Obstetrics, 6; Neurology, 5; Preventive medicine, 5; Roentgenology, 5. The average number in residence in *surgery and surgical specialties* was 128, distributed as follows: General surgery, 97; Ophthalmology, 10; Otolaryngology, 10; Urology, 7; Orthopedics, 4.

So far as one can observe the trend over so short a period as gaged not only by the number of graduate students accepted, which is determined in large measure by the facilities available, but also by considering the relative number of applications in the several branches, it may be stated that while there is no falling off in the number of applicants for fellowships in surgery there is a very great increase in the number applying for work in internal medicine and medical specialties. At the same time there is a slight increase in those seeking opportunities to major in the fundamental medical sciences, especially pathology, anatomy and physiology.

APPLICATIONS

Of the 1200 applicants each year for fellowships in the Mayo Foundation, about 90 are taken on service. Of the ones who are accepted their average age at graduation from medical school is a little under twenty-five years, that is about two years less than the average age at graduation of all graduates from Class A medical schools. This shows a tendency to the selection of younger men. No one beyond

thirty-five years of age is accepted and seldom anyone beyond thirty years. The average age at taking up residence in the Mayo Foundation is a little over twenty-seven, an average of about two years and four months having elapsed between the date of graduation from medical school and the date of beginning work in the Mayo Foundation.

PREVIOUS PREPARATION

About one-third of the fellows have completed four years of college work before beginning the study of medicine. All of the others have had two or three years of college work leading, in some instances, to the attainment of the Bachelor's degree during their subsequent medical course. All have graduated from American Class A schools or those of equal standing in foreign countries. The largest number from any one school are from the University of Minnesota and the next from the University of Pennsylvania, with the Universities of Chicago, Michigan, Johns Hopkins, Northwestern, Toronto, Harvard, Virginia and Iowa, closely following in the order named. About 10 per cent. ore from foreign universities, not including in these men from Canada. At present there are sixty-two universities represented by the students now enrolled.

After graduation from medical school the average of two years and four months training before coming to the Mayo Foundation has been spent as follows: An average of fifteen months in hospital residence, three months of additional laboratory service, and ten months in general practice.

CIVIL STATE

About one-third of the fellows are married before taking up residence in the Mayo Foundation. About one-sixth of the fellows get married while in residence. Thus one-half of them are married before leaving. Married men cannot support their families on fellowship stipends unless they receive first assistantships (usually near the end of their third year) and thus additional stipends.

PERIOD OF RESIDENCE

During the first twelve years of the Mayo Foundation's experience as a part of the University, beginning in 1915, about 10 per cent. of the fellows have left during or at the end of their first year. About one-half of these have left by request of the Faculty, the remainder of their own volition, usually because of financial or family reasons. Of those who have remained beyond the probation period the average period of residence during the twelve years has been thirty-three months for fellows majoring in preclinical branches, thirty-seven months for those majoring in internal medicine and related medical specialties, and forty-one and one-half months for those majoring in surgery and surgical specialties. This of course covers the period of the Great War and of readjustment thereafter. The average residence period at present, that is during the last five years, is approximately four years for all groups.

WORK WHILE IN THE FOUNDATION

1. Preclinical fields. The fellows majoring in preclinical fields, physiology, pathology, and so forth, have averaged 27.3 months full-time experience in laboratory work in their major field and 5 months full-time experience in laboratory work in their minor or related preclinical fields.

2. The fellows majoring in internal medicine and the related branches have averaged 29 months full-time experience in their own major clinical fields and a little over 8 months full-time experience in their minor or other clinical or related fields. In their major fields about two-thirds of their time has been spent in diagnostic work and about one-third in hospital residence. In the diagnostic service they average about four new cases a day. This seems to be a very small number but it must be remembered that practically all the cases seen are complicated, otherwise they would not have been referred to the Mayo Clinic by their home physicians. The hospital residence in most instances has been specialized, that is, the fellow for a certain period has had the care of only one type of case, as renal, thyroid, cardiac, and so forth.

Of the fellows majoring in internal medicine and related branches about one-half took their minor work in pathologic anatomy, about one-fourth in physiology and physiological chemistry, and the remaining ones in bacteriology, serology, and so forth. Many fellows after a quarter or two in their minor (preclinical field) have carried on their studies in this field for several years coincident with their clinical work. Much the larger number of theses require study wholly or partially within the minor field. There is a strong tendency toward the increase of time spent in research in the basic medical fields.

3. Of the fellows majoring in surgery and surgical specialties the average service of forty-two months was divided into an average of six months of full-time laboratory service in their minor field (in most instances in pathology), one year in diagnostic work and two years of operative work. During about three-fourths of the latter two years they were resident in the hospital. Fellows majoring in surgery have shown the tendency to relate the whole or major part of their thesis material to their minor field, though in most instances it has had also a definite clinical bearing.

PUBLICATIONS

Each graduate student who is a candidate for an advanced degree must present a thesis. This is not necessarily published. Indeed many of them are published only in title, and most of them in abstract or abridgment. There are, however, about sixty papers a year which are published complete or in abridgment, by fellows of the Foundation.

DEGREES

From 1915 to the end of 1927 the University of Minnesota has granted for work done under the auspices of the Graduate School but in the Medical School at the University and in the Mayo Foundation, a total of 282 advanced degrees. Of these 239 were Masters of Science (with field named in the case of all candidates previously holding the

M.D. degree), and forty-three were doctorates in philosophy. Of these 282 advanced degrees, 111 were in the basic medical sciences distributed as follows: 37 in anatomy; 29 in physiology; 22 in pathology; 18 in bacteriology; 5 in pharmacy. Fifty-six were in medicine and the medical specialties. Of these 21 were in internal medicine; 10 in neurology; 8 in obstetrics; 8 in pediatrics; 4 in dermatology; 3 in preventive medicine; 2 in roentgenology. There were 115 in surgery and surgical specialties. Of these 87 were in general surgery; 11 in urology; 9 in ophthalmology; 4 in otolaryngology; 4 in orthopedics.

It should be noted that a very considerable number of graduate students who have fully completed their residence requirements in the university but who have had to leave before the completion of their theses or other formal requirements are still eligible for their advanced degrees and it is expected that a fair proportion of them will yet successfully complete the requirements and be recommended for the degrees which they seek.

The relatively small number of men out of the total number of eligible candidates who have completed all the requirements for the degrees in the fields of internal medicine and related medical specialties, is accounted for by the fact that there is so large a demand for properly trained men in these fields that many graduate students have been tempted to leave before they have completed their graduate study or thesis work. Many of these are technically on leave and hope at some time to return and fulfill the requirements for their degrees.

Despite these two explanations it must be recognized, however, that even in the face of the very careful initial selection of personnel there is a considerable percentage of graduate men who are unable to meet the requirements for an advanced degree. If I were asked to name the chief reasons for failure of these groups I should say it was largely because of two factors: (1) Inadequate training

in medical school in the basic medical sciences, particularly physiology and pathology, and (2) lack of personal initiative.

While there is no obvious pressure brought on students by the Faculty to force them into high speed of work yet it is true that the men themselves set a very rapid pace and a man who is capable of doing only average work very soon finds himself so far in the rear that he is apt to give up. Such a one, of course, receives much personal attention from his chief but it is not the policy of the Graduate School to coddle weaklings and they are advised to go into other fields in which their slow gait may not be so obvious an impediment to their success.

DISTRIBUTION OF ALUMNI

Nearly 500 graduate students who have been one year or more in residence have left the two sections of the department of graduate medicine in the University. These are ordinarily referred to as alumni, though only 282 advanced degrees have been granted. About 70 per cent. of all the alumni are now in whole or part-time teaching or research positions in universities. A few who majored in preclinical sciences are now in charge of laboratories in large hospitals without teaching affiliations. About 80 per cent. of all those who are engaged in consultation practice either whole or part-time are in group clinics, or other partnerships. Slightly less than 20 per cent. are in consultation practice alone. So far as I have been able to determine only thirteen individuals have gone into general practice. These for the most part are men who left the Foundation after only a relatively short period of residence, their average stay in the Foundation being sixteen months. Of those holding academic rank, about one-half are still instructors, one-third assistant professors, and one-sixth associate professors or professors. There is one Dean of a medical school! In extenuation I may add that he is also professor of surgery in the same institution.

While no accurate figures are at hand or indeed possible one gathers the impression, even on a very conservative basis, from talking with the alumni, a large percentage of whom return for their annual reunion, that the period of "arrival" of men in clinical fields after leaving the University is from five to seven years. By date of "arrival" I mean that time at which a consultant is obtaining as much clinical work as he can carefully do. When we remember that these men have begun their graduate work at an average age of slightly over twenty-seven years, have left at an average age of thirty-one years, their age of arrival would appear to be thirty-six to thirty-eight years. This, I believe, to be a very favorable showing in comparison with that of able men who have "arrived" by various other methods of training. So far as I can determine men in medical and surgical specialties in the country at large arrive at about forty years of age. But of course there is a very great variation in different parts of the country and with different men in this regard.

SUMMARY

To sum up: The University of Minnesota, in an experiment lasting twelve years, has organized its laboratory, research and clinical facilities to give opportunity to young medical graduates of superior ability who have had about two years' experience, since graduation, in a hospital, laboratory, or in general practice, to fit themselves during an average period of four years for teaching or research in a basic medical science or for teaching, research and practice in a special clinical field of medicine. The work has in no way interfered with the progress of the undergraduate medical school. On the contrary, it has very greatly stimulated the ambition and character of the work of the undergraduate students. The organization of the work as a part of the general Graduate School of the University, instead of a part of the Medical School, it is believed, has been a very decided factor in the development of high standards and appropriate methods in a field where previous university experience was almost entirely absent.

The product judged by the character of the research of the graduate students, their teaching ability, and by their skill and success in clinical fields, is very much more satisfactory than had been hoped for. There is every reason to believe from present indications that this product in the future will be greatly improved in all the particulars named. It is to be hoped that many other universities may see their way clear as a few are now seeing it to develop similar graduate medical work, for which there is a very large legitimate demand.

II.

ON THE FUTURE OF GRADUATE MEDICAL EDUCATION

LUDWIG KAST

For any discussion of Graduate Medical Education it is necessary first of all to define the meaning of the term. In a larger sense everything is Graduate Medical Education that contributes to the physician's progress: His practice, medical meetings, consultations, medical literature, post-graduate courses, etc. They are all part of his graduate opportunities but for our discussion it is essential that the term be circumscribed to a clearer meaning. The following definition is suggested: Graduate Medical Education is the organized, planful opportunity and guidance of physicians in their mental and technical development after graduation. In this definition emphasis is placed upon the word guidance. To anyone sufficiently experienced in graduate teaching this will at once appeal. Some physicians do not know how much and where they lack in knowledge or method—but the majority do know it and are anxious to improve, but even they often do not know how best to go about it.

Graduate Medical Education cannot be considered by itself. It is only a part of the bigger problem of medical education as a whole. Graduate Medical Education begins after graduation and it never ends.

Over 500,000,000 dollars worth of life insurance has been rejected recently in one year because of impaired health of the applicants.

Over 50 per cent. of our school children have decaying teeth; over 25 per cent. have defective vision and over 30 per cent. have other easily recognizable and remediable handicaps of their growing bodies. Several millions of our children are growing deaf and permanently injured by neglected or malattended causes as anemia, chronic digestive impairments, tuberculosis, rickets, neglected infections of air passages and rheumatism.

Nearly a million people have tuberculosis and over a million boys and girls, at present attending schools are potentially mental cases, a large proportion of which will under present conditions inevitably become hospitalized, delinquent or insane. Millions of young people are mal-adjusted to their problems and environments of life and receive no constructive guidance. There are about one million patients with diabetes, one-half million with malaria, more than three millions with hookworm.

Several millions of people are now suffering from affections of their heart, kidneys and arteries which will shorten their usefulness, earning capacity and duration of life. To this can be added cases of preventable deaths from unnecessary, delayed or miscarried surgery and from inadequate medical diagnosis and therapy.

Over 500 million dollars are spent yearly for drugs and the economic cost of illness in our country has been estimated at over two billion dollars annually.

It is estimated that the loss of lives needlessly lost in our country from disease alone expressed in deduction from our national capital value is over 6 billion dollars annually. Anyone experienced in the practice of medicine knows that to these staggering defects of a national health service in a country more prosperous than any nation ever has been, must be added suffering and much unhappiness based upon medical problems which cannot be

included in statistics. We must also remember the urgent tasks waiting for legitimate medicine to bring better order theoretically and practically into our knowledge concerning the relation of individual psychology to physical ailments. When legitimate medicine will not hesitate to use terms of spiritual order in its interpretation of individual malady it will lift itself up from the level of chemico-physical biology to a higher order of science and art of healing.

For most of these problems in the health of our nation medical sciences offer by early prevention and by treatments, much relief. But there is a spread between what is being accomplished and what should be accomplished with proper training, organization and financial support. The spread between what is accomplished and what might be accomplished—the difference between the attained and the attainable—we might term our “*contemporary slack*.”

There is general agreement that this contemporary slack is primarily not the fault of the medical profession but lack of organization. But even if all the requirements were put at our disposal to take up our contemporary slack, we could not do it because there are not enough physicians trained for this work and there are no adequate facilities for training them on short notice. On the other hand *everything worth while that has been done in this country to improve individual and collective health-work was done through the initiative and through the sacrifices of the medical profession and logically the public remains indifferent to these problems since it is accustomed to and expects the medical profession to attend to these matters.*

In a way this is rather fortunate, because the alternative might be that inexperienced, though well meaning, people would build up mechanisms of health-service under political or haphazard control instead of under the only wise control of the medical profession in collaboration with communities.

The first task of Graduate Medical Education, would be, therefore, to take up our contemporary slack. While

this takes place, however, medical sciences will continue to bring forth new discoveries and new improvements in diagnosis and treatment.

Graduate Medical Education must therefore be flexible enough to take on also the dissemination of recent progress because a young doctor, even if he were turned out after graduation and hospital year at 100 per cent. perfection, which he is not and cannot be, will fall behind progress in a few years unless he has opportunity for graduate work.

A survey of medical literature shows that about five years represents a fair measure within which at any time in the last thirty years sufficient advance was made in diagnosis or therapy to render a practitioner less efficient, in the measure of his day, for not knowing it. A physician who has taken no graduate work for five years may still catch up, so to speak. After ten years only the exceptional man can find contact again with the advancing front and after fifteen years he is hopelessly behind times. This is true particularly about the general practitioner but is also true about the specialist.

Graduate Medical Education therefore must be conceived as a continuous educational opportunity that links medical practice to undergraduate training and also to the sources of new discoveries in the science and technic of medicine. The problem is how to bring speedily the benefits of medical sciences to the outposts of practice, to the ultimate consumer so to speak, which is the individual in health as well as in illness. For we must think of the practice of medicine not as a business nor merely as a science or as an art, nor as a profession but as a *social need*, as a commodity, essential in the life of our nation, a commodity which has its source of supply, its market value, its channels of distribution and its ultimate consumer. As a system so conceived, it must find close contact with the rest of the forces which make up our present day civilization, the health problems of communities, our economic problems and the philosophies of life which furnish the driving force in different classes and different parts of our

country. In other words we must think of Graduate Medical Education and of Medical Education as a whole in terms of social-mindedness.

The social-minded interpretation of medicine is the big problem of our generation. Just as our country has created new standards for essential services rendered by organized business to our Commonwealth, so is Health Service assuming the importance of a public utility. As such it is neither State property nor private property any more. Its right of existence lies not in priestcraft nor any more entirely in the personal relation between patient and physician, but in its service to the public and its support should rest in the interest of the same public. Likewise the medical profession is entitled to its legitimate moral and financial support and its legitimate material reward for services rendered.

The more social-minded our Health Service becomes the more right it has to claim the means for carrying on its present service and future growth. Social-mindedness does not stop at the profession of altruistic motives, but attempts to be efficient and economical. No one can reasonably maintain that our Health Service is efficient or inexpensive. It is probably the best we can do now, but the next twenty years will see a development that is likely to be surprising. Already the forces are appearing in strong surface currents. Graduate Medical Education will be one of the strongest. There is no danger of lack of interest in Graduate Medical Education. The danger is that there will be too much of it and that all sorts of unripe schemes will be put into action here and there and everywhere until there will be so much of an overgrowth in graduate enterprises as there were undergraduate schools twenty years ago, many of which had to be driven out of existence before decent order was attained.

In planning for the future we must assemble some principles upon which a definite policy for Graduate Medical Education can be built. Here are a few :

No amount of undergraduate training can impart the

attainable maximum of medical ability, for the simple reason that the intervening medical practice is an indispensable element in the educational attainments of the physician.

The undergraduate curriculum, already overcrowded, will inevitably overflow into some coöperation to be established between Medical Colleges and graduate departments, preferably within the structure of Universities.

There is a menacing shortage of physicians in rural districts. In smaller communities the general practitioner has not the equipment nor the support of up to date Medical Science. The general practitioners are gradually disappearing and specialists are taking their place.

Specialization has brought on a mechanizing of medical practice. There is too much reliance upon mechanical devices and not enough upon clinical thinking. The individuality of the patient is often lost in the avalanche of specialistic techniques and laboratory devices. Our present practice of medicine is often *depersonalizing* the patient and making illness a bewildering factor of modern life.

The cost of illness is assuming such proportions that some relief must be found. This problem is very complex and requires thorough study before any fundamental viewpoints can be gained but it is clear that the main fault lies in lack of an efficient system of medical service.

The public must be educated to the aims and needs of an organized, efficient and economic health service—and to coöperate through the agencies of our commonwealth in the building up of mechanisms suited to modern medicine.

Through the coöperation of our communities and the medical profession, organized units of medical practice should be created and widely disseminated from the large centers to outlying rural districts. These units should be properly organized within themselves and between the

units and centralized toward the centers of learning, teaching and research. The large number of diagnostic laboratories and of smaller hospitals that have been built and equipped in recent years all over the United States are already a beginning in this direction. Inevitably they will become centers of higher grade practice of medicine than the isolated practitioner can supply, particularly when they become properly organized and manned and correlated to each other.

These coördinated mechanisms of medical practice should be made the channels through which the currents circulate that bring advances and new discoveries of medical sciences into the fields of practice and bring trained observations of practicing physicians back to the centers of clinical experimental research. They could easily be made the means of Graduate Medical Education.

Present facilities for Graduate Medical Education are inadequate and cumbersome. The procedures of Graduate Medical Education are not sufficiently graded. If the practitioner wants to keep abreast of modern progress, the burden falls upon him, a man who is overworked, underpaid and does not occupy in the valuation of our commonwealth a place that is commensurate with the importance of his responsibilities.

Graduate Medical Education has ceased to be a repair shop for poorly trained doctors and is becoming an essential part in a system which conceives Medical Education not merely as Institutions but as a system of correlated and graded steps in the training of physicians and in offering them organized and tempting opportunities for their continuous progress as long as they are in practice.

Future plans of medical practice must be based largely upon the general practitioner. He must be reinstated not as he was but as his modern type, mentally and technically equipped to remain continuously connected with his base of scientific supply. He will be backed up, as a field worker, by organized grouping of specialists, not in competition but in coöperation with his work.

No scheme that is rigid or attempts to be complete from the start will be practicable; it is all still in the making. There are undoubtedly several ways in which a beginning could be attempted. Here are some of the elements of which a practicable scheme would be composed:
It should:

Be intricately interwoven with the work of practitioners.

Bring the opportunities for progress close to him and in a continuous not a sporadic method.

Require of the general practitioner the least sacrifice of time, effort and money for his graduate studies.

Require of the specialist the most exacting tests of ability.

Counteract the dangers of unrelated specialization and put a check upon the amateur specialist.

Provide a continuity of graded steps for advancement of physicians.

Include all the ingenuity and devices of our mechanical age, not to replace but to facilitate high-class clinical cerebration, and establish proper relationship between specialist and general practitioner.

Function in an economic and efficient manner by gradually including all forms of health service and by so doing make rightful claim upon the financial support of the community and in return offer inexpensive but high-grade individual and collective health service.

Support and not replace the general practitioner, and reach rural communities.

Provide, even in small local units, trained psychologists who will be able to furnish the necessary information in cases of neurosis, psycho-neurosis, psychosis and such functional derangements as are caused by emotional conflicts, maladjustments, etc.

If properly conducted this department would obviate arguments that team-work will mechanize and depersonalize modern practice and that the dear old family doctor

did it so much better because he was taking a "personal interest."

This personal interest should most assuredly be cultivated, in fact it is becoming a more essential element in the relation of physician and patient than it ever was but it should be based upon facts not fancy. The old family doctor did intuitively what modern medicine must supply scientifically with the personal touch of the general practitioner for whom the unit is working.

Future medicine will be increasingly based upon conceptions of heredity, constitutional tendencies, systems of functions, unifying interpretations of an individual instead of unrelated symptoms. All this requires the assembling function of the high-grade diagnostic mind. Such minds can be developed only through some system of Graduate Medical Education, therefore it should not be an occasional, sporadic and time consuming effort but should be as intricately interwoven with actual medical practice as possible. It should become part of medical practice, supported not by educational philanthropy but by the communities and the medical profession on a basis of fair exchange of service. Graduate Medical Education should be made an asset of the commonwealth. Medical Education is not separable from medical practice. Medical practice in the future will not be separable from National Health Service. Health Service, including Medical Education, will become an essential public utility.

In the future mechanisms of actual medical practice should be placed the opportunities for Graduate Medical Education.

There is of course the danger that the more complicated the practice of medicine becomes the less direct will be the relation between patient and physician. The solution lies in the spirit in which Medicine will become organized. It will be inevitable that functions in the practice of Medicine which can be carried out efficiently on an impersonal basis should be carried out as swiftly and economically as

possible like laboratory, X-ray examinations, etc. In fact this is already happening in large centers except that it is not so efficient and economical as it could be. On the other hand this very impersonal form of service upon which the attending physician may call, gives him a better opportunity to devote himself to that part of his function which is more a ministration of the higher and finer relationships between patient and physician.

It depends upon the purpose for which organization proceeds whether it becomes mechanical or not.

The old, traditional spirit of the medical profession need not be less helpful, less kind and less unselfish for being efficiently organized.

III.

GRADUATE MEDICAL EDUCATION AND THE PRACTITIONER

JOHN E. JENNINGS

A little more than five years ago the Medical Society of the County of Kings and the Long Island College Hospital Medical School began what has proven an interesting experiment in Brooklyn. It consisted in giving a course of late afternoon lectures on subjects of direct clinical interest to the general practitioner and in offering in conjunction with several hospitals of the borough, short courses at a nominal fee in a number of more or less practical medical and surgical subjects. Its originators and promoters—Doctors Frank D. Jennings and Charles A. Gordon—have described and reported its inception and progress. It has been successful to a large degree and is still going on.

The lectures are always well attended—often crowded—and the extension courses have had a varied fate. Some have been popular, others ignored, for reasons often hard to discern. In general, however, it may be said that a registration equivalent to about one-fifth of the medical population have taken one or more of the courses offered.

This year the joint committee again, under the leadership of its original chairman, Doctor Gordon, is renewing its vigor and enthusiasm.

I do not propose to discuss or describe in detail the vicissitudes of this enterprise but to offer for your consideration a few ideas suggested by observation of and participation in it.

The experiment, I said, has been successful but it would be idle not to admit that its success has been singularly limited by four obstacles.

First—the conservatism of some of the largest and best equipped hospitals which led them to refuse to participate in the movement.

Second—the partial and inadequate appreciation on the part of the academic group of the need of the practitioner.

Third—the lack of method and experience in teaching of many of the willing volunteers.

Fourth—the inertia and comparative indifference of the large body of the profession.

It is possible that all of these difficulties may be surmounted but the process will have to be gradual and lacking large funds, very slow. What might be attempted if sufficient funds were interested in such a movement is not altogether futile speculation but one which cannot even begin without considering the cardinal obstructions as they now seem to exist. I shall ask your permission to consider these for I believe they are rather general—quite fundamental and will apply to any mission for education to the active practitioner. They are: The rather singular separation that now exists between what we may call the school and the practitioner. They do not seem to understand each other. The practitioner is not aware of the modern development of the medical school. He knows little about it and is not greatly impressed with what he knows. He considers the young graduate informed but untrained and looks almost entirely to other clinicians

when he finds himself able to brush up or look for special training. He is too often obliged to work a great deal alone and in inadequately equipped institutions, is largely active in actually caring for the sick and has stifled the natural desire of every physician to investigate and to teach.

The college apparently has its eye on the absolute *second*: The no less singular development of the hospital which in many instances is not so vigorous a mechanism of training as it used to be. Too often the stress of increased expense and other factors have upset the balance that once existed between the charity and the private beds and the young assistant must serve a long time before his experience is large or varied enough to equip him as he needs. In many institutions no out-patient department exists or if one is active its armamentarium and methods render it a menace rather than an assistance to the sick. The conception of the hospital as a center for preventive medicine and for social service is still in the germ. Fortunately there are fine exceptions. Not every hospital can or should be a teaching institution in the present sense of the word but a hospital could and should be an institution of learning. There are some and will be more.

I believe that comparatively small sums of money if wisely expended could by endowing and administering a few small hospitals, effect an example which would greatly influence this whole situation. For it is in the hospital, such as it is, that the lamp of learning, though it flickers, still burns and a man may live the rounded life of a physician. He may still be a clinician, an investigator and an instructor and he still knows that education is not the giving or receiving of knowledge but the inculcation of a discipline which can be accomplished by responsible apprenticeship alone.

So far as the individual practitioner is concerned some mechanism is needed to bring him and the university together. It would be good for them both and for the patient and again—any plan will demand money.

I do not think that any scheme of lectures or of extension courses, short or long, practical or scientific, will have any profound influence on the present situation. I wonder if a plan could be devised. Would it be worth considering to accept the successful practitioner as a man whose adaptation to his environment had elements of virtue in it and to seek to isolate the essential oil? Could the old idea of Preceptorship be modernized at all?

Suppose that Doctor Doe, who has a good practice in Jamaica—which is sixteen minutes from the Pennsylvania station by the way—were to receive some day a letter asking for an appointment with a representative of the Gold Dust Foundation. Would he bite? He would. Suppose that able representative told him that he was one of 51 doctors who had been selected to take part in a movement for university extension in medicine, that his consent was sought and his advice requested. That a meeting of the Extension Faculty would be held at the university on Saturday morning, that his attendance would be appreciated, a director's fee waiting and the roll called. Would he be there? He would.

Supposing that at this meeting the relation of graduate and undergraduate instruction was recognized and that Doctor Doe was asked to associate with him two undergraduates and one graduate and to arrange his clinical records so as to conform with the standards of the university. His salary as a member of the faculty beginning on July 1st and his personal attendance at the summer session for extension teachers being expected. Would he yield? Would you?

One who assumes the activities of a critic must in some degrees accept the responsibilities of a minor prophet and I will predict that he would. That he and his fellows would do as much or more for the university as it would do for them and that the association would do much to mitigate the disorders from which medical education and medicine with it, are now suffering until they too shall have run their course.

Three evils affect medicine and medical practice among us today:

Commercialism—which has many forms and manifestations, chief of which, however, is the improper extension of veterinary medicine. Veterinary medicine is practice which is performed on the body of another without his solicitation or necessary consent. It is honorably performed upon animals in captivity. Wild animals do not enjoy it and free men resent it. In several subtile forms it is invading human practice.

Partialism—or Pseudo Specialism—in which the physician working alone or in group assumes only a partial consideration of the patient's problem without proper central and coördination by one familiar with the whole.

Standardization—which may be made a willing and useful guide and servant or may become an inexorable and tyrannical master if it be allowed to go beyond control.

It is charged that the digestive and correlative parts of knowledge are in most American colleges conspicuous by their absence. Would not some such plan as the one I have outlined promote and develop the restoration of these functions in the medical schools?

Would it not make possible a real integration of the fractional activities of us all?

ABSTRACTS OF PAPERS DELIVERED AT
SECTION MEETINGS

Section of Surgery, April 6, 1928

A STUDY OF GANGLION¹

WITH ESPECIAL REFERENCE TO TREATMENT

LOUIS CARP and ARTHUR PURDY STOUT

A ganglion is a cystic swelling usually occurring in close proximity to joints and tendon sheaths and it contains a thick mucinous fluid. The regions of the wrist, ankle and knee and the volar regions of the fingers and hand are most frequently affected.²

Genesis. The following are brief summaries of the hypotheses that have been given.

1. "A knot of tissue." This is, perhaps, the oldest conception of the pathology and the Greek word *gagglion* from which the word ganglion comes, expresses the thought.

2. Rupture of tendon sheath. This was advanced by Eller in 1746.

3. Retention cysts. Gosselin, in 1852, thought that they were retention cysts coming from a combination of the subsynovial follicles and crypts.

4. Neoplasms. In 1847 Henle regarded them as "mucinous tumors." Floderus in 1915 thought that ganglia were true neoplasms arising from a specialized connective tissue.

5. Herniation of tendon sheath or capsule of joint. This is to-day one of the most popular conceptions and was discussed by Volkmann and also Billroth in 1882.

¹ From the Department of Surgery and the Laboratory of Surgical Pathology, The Presbyterian Hospital, Columbia University.

² We have not included cysts of the semilunar cartilages in this study.

6. Origin from bursae. Vogt in 1881 offered this opinion.

7. Degeneration cysts. Ledderhose in 1893 and others advanced the idea that they were cystic degenerations in the connective tissue outside a joint.

Pathology. In no instance have we been convinced that ganglia resulted from direct communication with joints or sheath spaces. On several occasions the joint has been exposed but only for one of two reasons, namely, operative trauma or an almost complete disappearance of the capsule; and further, in these instances, the cyst wall has been complete and its contents had no connection with the fluid in the joint. The growths are attached to capsules of joints, tendon sheaths or both.

There are usually more than one cyst cavity and they are often multilocular. In the cysts and in the surrounding degenerated connective tissue is a material which simple chemical tests demonstrate behaves like mucin. The mucin seems to come from degeneration of the collagen fibres which are found fibrillated or absent in the affected areas. Cells are also found loaded with mucin-containing vacuoles. The cause of the degeneration remains obscure. It does not seem to depend upon inadequate blood supply because functioning capillaries are often found in considerable numbers in the areas of degeneration. Small bundles of nerves are often found passing through areas of degeneration. Although some multiplication of cells occurs we do not believe these lesions are neoplasms and we have never seen nor read of malignant neoplasms coming from them. Spontaneous infection or rupture of ganglions are very rare occurrences.

We have analyzed 255 cases. They occur most frequently in the second, third and fourth decades and about 75 per cent. are in females. Occupation and trauma are not important factors. About 70 per cent. of all the cases occur on the dorsum of the wrist and the remainder on the volar surface of the wrist, volar surface of finger, dorsum of

foot, popliteal and malleolar regions. About half the cases have pain. Most of the dorsal carpal ganglia are attached to the capsule of the joint and extensor tendon sheaths.

Etiology. We are not convinced that trauma and constitutional tendency are important.

The preponderance of ganglia in the second, third and fourth decades in females of slight build is generally a striking observation. The progressive diminution of the number of cases after the fourth decade and their comparative rarity in old age is also striking.

Anatomy. Those ganglia arising from the capsules of joints are intimately adherent to them, usually by a broad base, so that they can be excised only by sharp dissection. We have not been able to note a definite pedicle. Laterally on the dorsal surface of the wrist they are bounded by the extensor longus pollicis and mesially by the extensor communis digitorum and extensor indicis. The ganglia on the volar aspect of the wrist lie, as a rule, laterally between the tendons of the flexor carpi radialis and supinator longus. Here they are in close relation to the radial artery and in one of our cases this artery coursed directly through the capsule of the ganglion. On the volar surfaces of the fingers, they are intimately attached to the flexor tendon sheaths, usually at their bases and in some instances they are also adherent to the skin.

Symptoms and Signs. The symptoms may be grouped under deformity, function and pain. About half the patients complain of pain—this may be present only on use of the adjacent joints or may also radiate from the region of the swelling. Encroachment of the cyst on tendons frequently produces a sense of weakness in the fingers or toes to which the tendons go. The swelling may be very large or very small. On the dorsal aspect of the wrist and in the popliteal region they are apt to be largest and in our series there were two 6 cm. in diameter respectively. The smallest ganglia occur on the flexor tendon sheaths of the hand where they attain the size of a millet seed or split pea. Most ganglia are very tense, a few fluctuant, and

Section of Neurology and Psychiatry, April 10, 1928

CASE HISTORY AND POST MORTEM FINDINGS OF AN UNUSUAL TUMOR OF THE BRAIN

CHARLES A. McKENDREE and JAMES R. LISA

The following case is presented not only because of the unusual distribution of the lesions responsible for the clinical picture, but also because of the unusual nature of the new growth responsible for the clinical signs and symptoms.

The patient, of Italian parentage; aged eighteen, single; occupation, clerical; was admitted to the City Hospital on October 19, 1927.

The complaint consisted of headache, paralysis of the right side of the face, deafness of the right ear, paralysis of the ocular muscles on the right, numbness of the right side of the face, and pain in the left lower extremity.

His first symptom was noted in July 1925, and consisted of tinnitus in the right ear. The patient was well until the onset of his present symptoms. In July 1925, he noted buzzing in his right ear with gradual diminution of hearing on that side. In January 1926, his right eyelid began to droop and patient saw double. The ocular disturbance became progressively worse until date of admission, at which time he could not move the right eyeball and the right upper lid. In May 1926, he first noted numbness of the right side of his face. In July he experienced severe headache on the right side, accompanied by the gradual onset of pain in the right side of the face. He was admitted to Mount Sinai Hospital in August 1926, where a craniotomy was done and tissue was removed for histological examination. The headache was relieved by this procedure for a time, but had recently become severe. Some time after the operation, the patient noted that the left side of his face was pulled to the left. Since August 1927, patient has suffered very severe pain in the entire

left lower extremity. The past history was irrelevant except for the fact that in April 1927, the patient suffered from vertigo, which was so marked that he was unable to walk; objects seemed to revolve but the direction could not be ascertained. The personal and family history are irrelevant.

PHYSICAL EXAMINATION

The patient is very much emaciated and presents marked flattening of the right side of the face, and complete ptosis of the right upper eyelid. The gait is normal in all phases except for slight unsteadiness due to weakness. The equilibratory and non-equilibratory tests are all normally performed. Skilled acts are normally done. There is some dysarthria due to facial paralysis, and some dysphonia. There are no abnormal involuntary movements. The deep and superficial reflexes are normal and equal in upper and lower extremities. Muscle strength is fair in all groups. Muscle status is normal except for marked hypotonicity in the lower extremity. Generalized wasting and atrophy of the right side of the face. There are no abnormal associated movements. Signs of meningeal irritation are absent.

The general sensory examination for touch acuity, touch discrimination, pain, temperature, vibration, muscle-tendon sensibility, is normal except for the right side of the face, noted below. Stereognosis was normal.

Cranial Nerves—There were no olfactory disturbances. The sense of smell could not be accurately determined because of intranasal pathology. The fields of vision were normal to rough tests, there was a pallor of both discs, the left being more pale than the right. In the opinion of the consulting ophthalmologist, this pallor was post-neuritic atrophy. The pupils were unequal in size, the right 5 mm., the left 2.5 mm. The right did not react to light, the left reacted normally. There was slight exophthalmos on the right. The left eye moved normally in all directions. The right eye had no movement in any direction. There was

no true nystagmus, but there were a few nystagmoid jerks on the left in extreme positions. The left palpebral fissure was normal, the right was entirely closed because of complete ptosis. There was haziness of the cornea on the right. There was marked flattening of the right temporal fossa and the right side of the face. There was marked weakness of the masseter temporalis and pterygoid muscles on the right. There was numbness on the right side of the face with complete analgesia and anaesthesia of the right trigeminal distribution to all forms of stimuli. There was complete right facial paralysis with loss of taste on the anterior two-thirds of the tongue. There was deafness on the right with no vestibular reactions to stimulation on that side. The palate rose very slightly on each side upon phonation. The quality of the voice was somewhat nasal. Examination of the vocal cords showed no actual paralysis, but the tensor action was weak on each side. The spinal accessory nerve was normal. The tongue protruded in the mid-line and to each side normally and presented no atrophy.

The systemic examination, including the tegumentary, glandular and cardiovascular status was normal. Examination of the lungs revealed no abnormality. X-ray of the chest presented no essential pathology. Abdominal examination was negative.

Examination of the skeletal system revealed an osteoplastic flap deformity on the right side of the head. X-ray of the skull showed signs of increased intracranial pressure, the entire vault was very thin; sella turcica showed no evidence of enlargement or destruction. Examination of the vertebral column and X-ray of the four extremities were negative except for periosteal thickening in the upper portion of the left femur.

Mental status, except for irritability and under-productivity, was normal.

The blood and spinal fluid serology was entirely negative. Blood count showed a moderate secondary anemia.

SUMMARY OF FINDINGS

1. Pallor of both optic discs, left greater than right.
2. Ophthalmoplegia totalis on the right.
3. Total paralysis of the right trigeminus nerve.
4. Complete peripheral paralysis of the right facial nerve.
5. Nerve deafness and loss of vestibular reactions on the right.
6. Weakness of the palatal muscles with sluggishness of vocal cord action.

Our clinical interpretation of the case was that we were dealing with a neoplasm at the base of the skull on the right side, involving by multiple processes the second, third, fourth, fifth, sixth, seventh, eighth, ninth and tenth nerves. The nature of the tumor was unknown, but we had received a report of the histological study of the material removed at operation which indicated the presence of a sympathoblastoma. The patient died December 10, 1927, of broncho-pneumonia.

The autopsy and histological studies are reported by Doctor Lisa.

SOME UNUSUAL TUMORS OF THE THIRD VENTRICLE

PERCIVAL BAILEY

At the beginning I would like to say that in Boston brain tumors are not always well diagnosed, nor well examined pathologically. They are often well operated on by Dr. Harvey Cushing. And a few of these cases I want to present to you this evening. We shall see that they have not always been well diagnosed, and you can make up your own mind as to whether they have been properly examined microscopically.

You will also see that they have been well operated upon. I fear the remarks I have to make will not prove excessively interesting to you but my interest in this subject was aroused by the entrance of a young lady of 23 years into the clinic of Dr. Harvey Cushing, complaining that she fell asleep in the most inopportune places and at the most inappropriate moments. She was a school teacher and had charge of the sixth grade in the public schools, and she was accustomed to fall asleep suddenly during the class, to the great amusement of the students, of course, so that she was obliged to resign her position. This, of course, affected her seriously, as she was obliged to earn her living.

It seems that some six years before her entry into the hospital she had had an attack of febrile jaundice, which was thought to be due to malaria. The jaundice disappeared and she had developed these attacks of sleepiness. These attacks were accompanied by weakness of the knees and were usually brought on by any exertion or excitement, and were followed by periods of depression in which she wept and felt out of sorts. These had finally begun to be accompanied by headaches and it was for that reason the doctor in charge of the case sent her into the hospital. We could find none of the general symptoms of brain tumor.

Her spinal fluid tension was normal. She was adipose, having gained about forty pounds in weight. She had a delicate skin. Her menses were irregular. She had a slight polyuria. Her basal metabolism was not done.

I had never seen so clear-cut a case of what is described in the literature as narcolepsy, as was presented by this patient, and Dr. John Fulton, who was working in the clinic was also interested, so the two of us put our heads together and decided we would try to find out if we could not learn something about this disease. It was described by Gelineau, a Frenchman, some years ago, and recently numerous papers have been appearing on the subject. These patients are exceedingly interesting, for the simple reason

that they drop off to sleep at the most inopportune moments. Adie in his paper decides there must be some lesion in the basal region of the brain which is associated with this disease, or syndrome; and the few slight general constitutional symptoms of our patient caused us to look up tumors which had occurred in the clinic to see if we could not find something similar.

The first patient which I want to present this evening had attacks which resembled very closely these of this young lady, in the early part of her disease.

She was 28 years old when she entered the clinic. She was almost constantly somnolent. She could be aroused to take her meals; otherwise fell asleep and slept practically continuously. She gave the story of having begun six years previously, two years after the birth of her first infant, to fall asleep. She was accustomed to play pinochle with her husband and usually won. She found she was losing because she fell asleep in the middle of the game. And shortly afterwards she began to fall asleep when visitors came. Shortly after these attacks she began to have polyuria.

She was not conscious of any great thirst, although she remembered she drank excessively at that time. The symptoms continued and at the height of the polyuria she was drinking five or six gallons of water per day and putting out the same amount of urine.

About three years after the polyuria and the sleeping attacks began headaches occurred but were never a very prominent symptom. From the very onset there was remarkable fluctuation in her weight. She weighed about 138 pounds at the time the illness began. Six months afterward she weighed 120. Then gradually she began to gain so she was over 200 pounds when she entered the clinic.

The menses had stopped completely and had not returned, although she had severe pain radiating over the abdomen and recurring at regular monthly intervals.

She was found to be a very adipose woman, as you can see, very sleepy, very stupid, really more than sleepy at that time, somnolent, and half comatose, very adipose, with the pubic and axillary hair gone.

She could hardly be aroused to have her picture taken. She had a primary optic atrophy in both eyes with a bi-temporal hemianopsia, by rough test. And she had no polyuria at the time she was in the hospital.

She states, and her husband swears that when she was so much annoyed by the polyuria they went to California and there a doctor put her on Vita Nuova treatment. This consists in going on a certain dietary regime in which nuts figure largely, and meat is forbidden. Two weeks after beginning this diet the polyuria disappeared, never to return. Aside from the primary atrophy in both eyes, little was found. Her sella turcica was normal, as you can see here, so that only a subtemporal decompression was done, being unable to locate the tumor. That was some years ago. You might suspect its localization to-day. Its nature I think no one would be able to tell even to-day. The patient died of hyperthermia. A necropsy of the brain alone was permitted. There was found a small firm vascular tumor in the hypothalamus. The stalk of the pituitary body was normal. The pituitary body was normal in size. You notice that there is no internal hydrocephalus.

You see the stalk of the hypophysis, and the optic chiasm, in which practically all of the nerve fibers have disappeared. The whole tuber cinereum and hypothalamic region is involved by the tumor.

A reconstruction made from medium sections shows the extent of the tumor. Not all of the tissue in this region was destroyed by the tumor. It had infiltrated along the vessels, but the gross extent of the tumor was about so, leaving the hypophysis entirely free. Microscopically the tumor proved to be made up of small round cells; mitotic figures were fairly numerous. Here is one I think you can recognize. Some of the cells were multi-nucleated;

some showed what might be interpreted as amitotic division. These cells were enclosed in a reticulum of the connective tissue, which had a tendency to whirl around the blood vessels as is often found in sarcoma.

You see here the tumor in the subarachnoid space.

This shows the anterior part of the hypophysis with normal distribution of the chromophile cells. Here is the posterior lobe perfectly normal. A little cyst, as is usually found in the pars intermedia.

This was to me a very interesting tumor. It was microscopically, I think, a sarcoma. That is to say, a malignant round cell tumor of mesodermal origin. Whether it was primary in the brain or not I am not prepared to say, because a complete necropsy was not done. There were no clinical signs of tumor anywhere else in the body. At any rate, no symptoms of which the patient complained which might be so interpreted.

The case was an interesting one from the onset. One might have taken her as a typical case of narcolepsy had it not been for the intense polyuria. Furthermore her menses had stopped very early. The intensity of the polyuria and the cessation of the menses might have made one think it was not an essential narcolepsy, but the attacks of sleepiness were perhaps typical of those which occur in narcoleptic patients. I would like to call your attention to the presence of a complete adipose genital syndrome without involvement of the hypophysis. Perhaps the secretion of the hypophysis was shut off, but if that were so there was no evidence to be found in the histological examination of the hypophysis itself. The patient had a complete syndrome with diabetes insipidus and narcolepsy from a small tumor which had not given internal hydrocephalus, and probably not intracranial tension.

In the absence of the general symptoms of tumors the patient had narcoleptic attacks early. The early syndromes in cases of brain tumor are those of importance from a localizing standpoint. It seems that this tumor confirms

the idea expressed by Adie, that perhaps a lesion in the third ventricle or the diencephalic portion of the brain is responsible for these narcolepsy attacks.

I will show you another case which is interesting from the pathological standpoint. This patient was a man of 38 who had always been well until suddenly one day in 1924 he fell ill with severe headache and vertigo. In 1926 he had a similar attack in which he slept continuously for a day and a half. Other attacks of severe headache occurred, in which he was very uncomfortable and vomited, but he never had another sleepy attack.

Little was found on examination except choked discs and vague cerebellar symptoms. A ventriculogram was done which showed that the third ventricle did not fill, but very little attention was paid to that because ventriculograms sometimes do not fill the third ventricle. He had a suboccipital exploration done. I don't know how it is in New York; that is probably the most frequent error made in the neurosurgical clinic, to operate on the cerebellum for a tumor in the region of the third ventricle. The operation at any rate was well done. He recovered rapidly and was discharged from the hospital apparently relieved. Some thickening of the arachnoid was found around the cerebellum.

He went home and a short time afterwards his physician called up and said he had an attack. It was suggested that they do a lumbar puncture, which they did, and he died. As you see, he died from a pontine hemorrhage. We were fortunate enough to secure an examination of the brain, and were greatly surprised to see this small round tumor, about the consistency of a rubber ball, sitting in the third ventricle, which is scarcely dilated, attached anteriorly, free behind. There was a certain degree of internal hydrocephalus. We had never seen a tumor of that kind, and had not the slightest idea what it might be, until we began to delve into the literature and found some twelve or fifteen of them (which usually happens if you search

diligently enough) described under all kinds of names and in odd places.

Inside of the tumor is a mass of colloid material without structure, and around it is a cuboidal epithelium with some tufts of choroid plexus on the lower surface, as you see.

The other descriptions of similar cases really show practically the same thing, a cyst filled with this colloid material which after fixation becomes about the consistency of a rubber ball.

These patients have sudden severe bouts of headache. A woman will be going about doing her marketing when she will have a severe headache, lie unconscious for three hours and then go about her business only to have the same thing recur. Finally in one of these headaches she will die. Most of these tumors have been recorded in the Scandinavian literature. Sjövall, a pathologist in Sweden, supposed that this tumor might be a remnant of the paraplysis. You know that in the fishes there is a large organ growing from the anterior extremity of the roof of the third ventricle and extending posteriorly. In the human embryo it is rudimentary and disappears very early. The point of attachment of these tumors makes the hypothesis of Sjövall seem to be quite reasonable.

The next patient also had a tumor confined to the third ventricle itself. He was a young man who while doing his college work began to be taken with severe headaches. He had the same attacks from which he would recover and go about his business. He was very drowsy and thought to have epidemic encephalitis. He soon showed just emotional indifference, sometimes like a patient with dementia praecox. He had had a left osteoplastic exploration in New York. We did a suboccipital exploration. Finally the tumor was located in the third ventricle and an attempt was made to remove it by going through the right hemisphere. There was a huge internal hydrocephalus and the tumor, which lay in the third ventricle, was seen but could not be removed. It was attached to the right column of the fornix.

This illustration shows the tumor lying in place. It fills the entire third ventricle with the exception of the infundibulum and was not attached anywhere except to the right column of the fornix. I interpret it as a glioma of the type known as an astroblastoma.

The last patient I will speak of was a boy 15 years or so, an Italian boy, who came first to the Massachusetts General Hospital complaining of constipation. The doctor was busy, and gave him some pills and suggested he come back the next day and bring a twenty-four hour specimen of urine. He came back with three gallons. He entered the Boston City Hospital and there they did a lumbar puncture which was practically normal. They attempted to suppress his polyuria with pituitrin but he insisted on being discharged and came over to the Brigham Hospital.

This is the patient as he was when he entered. You see a rather undersized but otherwise fairly normal Italian boy. Aside from his slight emaciation and polyuria, nothing could be found. Since his polyuria was not stopped by pituitrin, some thought he had a psychoneurosis.

We had seen a similar patient who had proved to have a tumor in the third ventricle and proposed to do a ventriculogram, but he made such a fuss we discharged him and he then went to the Massachusetts Hospital. Here he developed swelling in the parotid glands and they thought he had mumps. Then they decided he had an angioneurotic edema. They found he had an abnormal spinal fluid but were unable to arrive at a diagnosis. He had at this time mental symptoms which interested the psychiatric service and he was transferred to the Department of Abnormal Psychology of the Harvard University. They examined him and decided his water drinking was a compulsory neurosis. This conclusion was not so extraordinary when you hear the story. The boy was one of a large family of children. His father was a barber, a Neapolitan, a very dominating person who felt he should be Lord of all he surveyed, as far as his family went. His mother was very submissive, but an interminable talker. The father

thought the mother was the most aggravating person of his acquaintance. When he could stand her chatter no longer he used to beat her. The boy took his mother's part and used to battle with his father. He used to help his mother with the household work. One of his earliest recollections is going to the well to bring water for his mother and while there he was beaten by another gang. He remembers going afterward to the well and drinking copiously of the water. His mother taught him drinking water was the best way to get rid of fear. When he was thoroughly beaten by this gang, he began to drink copiously of water and continued. That was the onset of his polyuria. It continued ever since with fluctuations up and down. After he had been in the Brigham Hospital he became quite well when his father was sent to Deer Island for beating his wife. Later a policeman gave him a beating, after which his polyuria started off again, but afterward improved and then began again with an acute exacerbation when his father got out of Deer Island.

His polydipsia was therefore thought to be a compulsion having something to do with his fears. He was sent to the country to get out of his family life, and there he continued to do very well for a time, but later he began to fall asleep in the course of the day and they could not rouse him. And he complained he could not see well. The mother brought him into the hospital and we thought he was in extremis. He was sluggish; his pulse was slow. When Dr. Cushing arrived he was sitting up in bed talking and laughing with the nurse. At five o'clock he was found dead in bed.

At necropsy there was found quite a large tumor lying in the region of the third ventricle. The whole third ventricle is filled with the tumor.

The pituitary body is not involved.

It shows that the tumor had disseminated itself all over the lateral walls of the ventricle.

Necropsy proved it to be a pinealoma. The structure is quite unmistakable with these islands of large round cells, and the islands of lymphoid cells scattered amongst them. The tumor, therefore, was a pinealoma which had probably not produced localizing symptoms because it extended only into the third ventricle. His polyuria was due to involvement of the tuberian region, as happens frequently with pinealomas. It may be that when he had his fight with the rival gang a part of this tumor was broken off and lodged in the infundibulum giving rise to polyuria.

I thought these cases presented something of unusual interest. They were strange to me. They are also interesting, I think, from the light which they throw on the ordinary psychological phenomena which at least are able to be disturbed by some lesion which lies primarily in the region of the third ventricle.

MADAME DEJERINE-KLUMPKE

1859-1927

SMITH ELY JELLIFFE

French neurology and neurology the world over mourns the loss of a personality rich in character and in scientific achievement. Madame Dejerine, whose death occurred in November 1927, was, in the words of Professor Roussy, "one of the most beautiful and greatest figures in contemporary neurology." Her memory is enshrined among those who shared the kindness and the greatness of this personality and in the nature of her work. For the latter was performed with such thoroughness, such demand for accuracy, and opened up so much hitherto undiscovered knowledge of neurology that it must continue to bear fruit.

Mademoiselle Klumpke was born in San Francisco in 1859, one of a family of sisters who distinguished themselves in fields of art and science. She was eleven years of age when the family went to Europe, to Germany, then to Switzerland, where Mademoiselle Klumpke received her

academic education. She proceeded to Paris for the opportunity to study medicine, an opportunity which was hard-won. Vulpian, later her teacher, and the one who exerted a life-long influence upon her scientific ideals and attainments, was opposed to the entrance of woman into medicine. His objections were nevertheless overruled and Mademoiselle Klumpke was not only allowed, in company with a few more mature women, to avail herself of the medical course—with great precautions, to be sure, on the part of Vulpian—but step by step she won the place of first woman externe and then interne in the hospitals of Paris.

She came early into contact with Dejerine, both of them sharing the inspiration and training of Vulpian. After their marriage their work continued in closest association until his death in 1917. Madame Dejerine as a woman was distinguished by a modest self-reserve combined with a warmth and kindness of nature which made her beloved as wife and mother, as hostess and ever-ready guide and teacher to the students. At the time of her death she was engaged with Madame Sorrel-Dejerine, her daughter, and Dr. Sorrel, her son-in-law, in building up the foundation which she had established in memory of Dejerine for the Faculty of Medicine. This has taken the form of a laboratory, museum and library for the advancement of neurological study, and is now located in the building of the pathological department of the University, Gustav Roussy occupying this chair.

To set forth any adequate review of Madame Dejerine's work in neurology would be to write the entire history of modern French neurology. It began with the Dejerines in their insistence upon continual serial sectioning of whole brain material. This fundamental attitude gave rise to the partnership work on the *Anatomy of the Nervous System*, 1894, which stands as a monument to Madame Dejerine's attitude toward anatomical science in the neurological field. In this work may be found that organizing

genius of her mind; its capacity for detail and its ingenuity in presentation. The anatomy of the nervous system at this time was in a chaotic state. The newer researches of Golgi, Cajal, Forel, and His and the entire reformulations which followed upon the establishment of the neuron theory necessitated an entirely new approach and a more rigid elaboration of neural topography. This work accomplished, this and more and stands as the summit of many years of patient research. For it was as early as 1883 while still an externe in Vulpian's service that Mlle. Klumpke published two remarkable studies which have become classic, upon the relation of radicular palsies of the brachial plexus and ocular disturbances and now extensively quoted as the Klumpke type of radicular palsy of the brachial plexus.

Her thesis continued her studies of peripheral nerves which had always interested her and dealt with polyneuritis in general and the lead palsies and atrophies in particular. Then married to Dejerine, a number of studies from the pathological laboratory at the Bicêtre and then at the Salpêtrière followed. Among the most outstanding of these were those of secondary degenerations following lesions of the cortex; the course and connections of the Ruban de Reil; the red nucleus, aberrant fibers of the pyramidal tract, the course of the cuneus fibers in the corpus callosum.

These found a systematic presentation in the well-known anatomy of 1894, such a union of work of husband and wife as has rarely been seen. An immense number of studies followed this monumental treatise. It seemed but the beginning of a series of fertile researches with such students as André Thomas, Jumentié, Roussy, Mouzon, Foix, Landau, Long, Nageotte, Tournay, Lhermitte, Tinel, Barré, Cellier and others.

When the war came she entered the field and was active among the wounded at the Salpêtrière and later at the Invalides. Now the care of cerebral injuries was minutely studied and the indications for surgical treatment of spinal

cord injuries. The monumental work of Tinel upon peripheral nerve injuries was a continuation of her work upon the evolution of these situations.

Even the death of Prof. Dejerine in 1917 did not interrupt her work. With her daughter and Cellier at the Invalides there came forth the remarkable study of parosteopathies of spinal paraplegias and with Regnard she described the sympathetic synesthesia of paraplegics and ocular disturbances due to lower dorsal cord lesions.

In 1920 came the establishment of the "Fondation Dejerine" which with the coöperation of Mlle. Dejerine assured to the Paris Faculty of Medicine, a laboratory, museum and library consecrated to the furtherance of neurological science. In the words of Prof. Roussy in his eulogy to Mme. Dejerine, this Foundation was created as a memory to the forty years of labor consecrated by Jules Dejerine to scientific research in neurology and to the recognition and welcome accorded in France in a period when feminism was so decried, to the six children of John Gerard Klumpke and of Dorothea Matilda Tolle, his wife of San Francisco, who found important facilities for advanced educational work in France in the Faculty of Medicine, of Sciences, the Beaux Arts and the National Conservatory of Music.

I cannot forgoe the mention of one incident in her career, also mentioned by Roussy in his *éloge*. I had the rare privilege of visiting the Dejerines in their summer home near Berne. The swiftly flowing river Aar was at their door. A young woman not able to swim had ventured in and was about to drown when Dejerine, a strong powerful man, endeavored to save her. He, too, was threatened with drowning and Mme. Dejerine threw herself into the water, all clothed and rescued both of them. Anyone who saw, as I saw many years later, the seething foaming stream could realize the courage and capacity of this remarkable woman and could well understand the stamina that has given so much to neurology not only in France but to the world.

With us in this country one can point with pride to many whose work has been of outstanding value from their contacts with the Dejerine example. Spiller of Philadelphia is among the earliest of the Dejerine pupils; Adolf Meyer of Baltimore another.

Section of Pediatrics, April 12, 1928

ACTINOMYCOSIS OF THE LUNG

REPORT OF A CASE TREATED BY BRONCHOSCOPY AND INJECTIONS OF LIPIODOL

F. ELMER JOHNSON and JOHN DEVEREUX KERNAN

In the summer of 1925 this patient lived on a farm in Iowa and developed a habit of chewing grass.

In October 1925, at the age of three years he began to cough. This continued all winter but was not thought serious enough to seek medical advice. In June 1926, however, he began to lose weight and have a slight temperature. He was then brought for examination. Over the base of the right lung, marked dullness with amphoric breathing was found. A diagnosis of lung abscess was suggested, although no history of the inhalation of a foreign body was obtainable. There was clubbing of fingers and toes. A Roentgen-ray examination showed a shadow in the right lower lobe and was interpreted as consolidation. Intracutaneous tests and sputum examinations were negative for tuberculosis.

On June 22nd, 1926, Dr. John D. Kernan passed a bronchoscope. Just below the opening of the middle lobe bronchus, there was an edematous swelling of the mucous membrane. Beyond this point, what seemed like a foreign body was seen. This was coughed up and immediately a large amount of foul smelling pus was released and aspirated. The object proved to be a piece of fibrin. The breath became very foul after the bronchoscopy.

For three weeks following the operation, the lung shadow became less dense and the general condition improved. This improvement, however, did not continue and another bronchoscopy was done July 30th. Although bronchoscopies were repeated eight times during September, October and November, the process extended into the upper and middle lobes of the right lung and the child's general condition grew worse. At this time the organism of actinomycosis was isolated.

From December to March, seven more bronchoscopies were done and at each, 5 c.c. lipiodol were injected into the diseased lung. Large doses of potassium iodide, sixty grains a day and deep X-ray therapy were also given. During the entire illness postural drainage was encouraged. At each bronchoscopy, small amounts of sanguinous purulent material were aspirated. The amount drained or aspirated was never sufficient to empty the cavities. The material in the cavities as found at necropsy was too tenacious and thick to be aspirated through a bronchoscope.

From the time the lipiodol was started, until the child was taken sick with pneumonia in March 1927, there was a steady improvement in weight and general condition. He died March 8th, 1927, of the pneumonia.

Anatomical Diagnosis: Pulmonary Cavitation, Chronic Pleurisy, Pulmonary Fibrosis, Acute Broncho-Pneumonia with Fibrinous Pleurisy, Fatty Liver, Hyperplasia of Bronchial, Mesenteric and Intestinal Lymph Nodes.

BACTERIOLOGY

In spreads from thick mucoid material obtained by Dr. Kernan on bronchoscopic examination, short branching threads with clubbed ends were found, which stained with methylene blue and retained the Gram's stain.

From the necropsy material a growth of actinomycoses was obtained in broth cultures, but animal inoculations were negative.

This case is reported because of the rarity of the condition and because we believe the injection of lipiodol by bronchoscopy offers a new method of treatment. This should be supplemented by large doses of potassium iodide by mouth.

This case proves that many bronchoscopies may be done on a three year old child without injury to larynx, trachea or bronchus.

Actinomycosis should be suspected in all cases of lung abscesses in children who have been playing on the ground in the country.

There may be great difficulty in growing the organism of actinomycosis as illustrated in this case.

BODY MECHANICS AS A FUNDAMENTAL FACTOR IN PEDIATRIC PROBLEMS

ROYAL STORRS HAYNES

The subject of body mechanics underlies the handling of almost all the problems related to the health and growth and happiness of children. Faulty action of the various elements of our body creates an obstacle which may determine defeat of whatever we may attempt to accomplish.

The word mechanics is preferable to "posture" because the latter is too static in idea. Not only the position of the body in relation to the vertical must be considered but the meaning of every detail of outline in terms of the unitive relationship of parts and their interaction.

On complete physical examination must be made including functioning of all joints and muscles.

Principal mechanisms to be considered are the lumbar; the thoracic compression; the position of the body; the standing mechanism in the lower extremities. The oblique many types of children for whom correction became very fine may be of help.

The relation of diet and digestion to this subject is close. The relation of basic diets, calcium and phosphorus metabolism to this subject are suggested.

The support of the trunk by the lower extremity is active, pushing the trunk away. The foot is still somewhat a cerebral member.

Children have unconscious movements under observation which reveal an underlying mechanism which begins at the hip joint by which we stand correctly.

This mechanism is in its detail identical with the positive supporting reflex in decerebrate animals. This mechanism is undoubtedly the expression of a spinal reflex.

The method of correction illustrated is a harmonizing of cortical control with the reflex patterns existent in all animals.

Section of Medicine, April 17, 1928

THE CAUSATION OF ANGINA PECTORIS

WILLIAM H. RESNIK

It is essential to differentiate clearly between genuine angina pectoris as originally described by Heberden, and the various types of heart pain that may resemble angina more or less closely. Angina pectoris is more than heart pain. It is a condition characterized by (a) paroxysmal chest pain and (b) *the likelihood of termination by sudden death*. Genuine angina is always due to anoxemia of the myocardium. That is to say, the attack is brought on when the oxygen supply of the heart is inadequate to meet the oxygen demands. Review of the literature reveals that practically all cases of angina are due to coronary disease or aortic insufficiency. The production of anoxemia of the myocardium by coronary disease is obvious, and recent experimental work has demonstrated that there is a diminished coronary flow in aortic insufficiency, reasonable

grounds for assuming that anoxemia of the myocardium may ensue. In the few remaining cases of true angina where neither coronary disease or aortic insufficiency are present, there are other conditions such as anemia, or arteriovenous fistula, capable of reducing the oxygen supply to the heart muscle. Uncomplicated aortitis is never associated with true angina; if angina is present, there are additional lesions such as coronary disease or aortic insufficiency. The frequency of aortic disease is merely a coincidental occurrence in angina pectoris. Analysis of the prevailing theories—1. coronary spasm, 2. disease of the aorta, 3. myocardial exhaustion, demonstrates that they are open to serious objection and are unacceptable. There is strong evidence to show that anoxemia may cause the two characteristic features of angina, the pain and the sudden death, which is due to ventricular fibrillation. The recognition of the clinical picture of acute coronary occlusion has brought powerful support to the establishment of the anoxemia theory. Acute coronary occlusion differs from angina pectoris only because the anoxemia in the former condition is severe and prolonged and consequently introduces another factor, myocardial infarction, and the events that depend on this condition.

Section of Orthopedic Surgery, April 20, 1928

DEFORMITIES FOLLOWING EPIPHYSITIS IN INFANCY

EDGAR S. OPPENHEIMER

Like other metastatic conditions, systemic infections are spread through the blood stream and the most usual sites for secondary deposits are in the liver, spleen and osseous system. The location of the foci in the osseous system will vary according to the age, as the blood supply develops. The greatest and most sluggish blood supply is at the epiphyseal lines. In infants this is typical in osteomyelitis and it should be termed metaphysitis when so limited.

Typically it is multiple. Depending on the severity and nature of the infectious organism and the body reaction, we see different local reactions. If the nutrient artery is blocked there ensues an osteomyelitis. The blood supply in the long bones usually takes care of the organisms there and the bacteria remain in the metaphysis, as shown in the work of Joseph Koch. (a) The local reaction is shown by abscess formation breaking through subcutaneously with frank pus. (b) The abscess is absorbed in the fascia planes and no evidence of pus is left. (c) The joint may be directly involved—effusion, dislocation and contractures result. (d) The bacteria may leave the capillaries and via the lymph spaces extend through the periarticular structures and cause effusion in the joint. (e) The condition remains very circumscribed, as in “Brodie’s abscess”; causes local necrosis, gives no signs but by destroying the cartilage; at a later date is evident as retardation of growth in all or part of the epiphysis, and obliteration of the growth line.

Sixty per cent. of bone infections in the first year of life are fatal. The immunizing effect of the dominant infection which may not be in bone causes a different reaction in the other foci and long after activity may be seen in these unsuspected places. In this way without the history of any bone infection, deformities of gradual onset may arise, with a negative history.

Five illustrative cases are shown, each giving a different picture; three with multiple lesions. All have growth disturbances, joint luxations and contractures. One case is of especial interest, showing an extraordinary clinical picture. Female five years old, normal at birth, at three months history of bronchitis followed by paralysis and later gradual onset of contractures of knees and hips. Tenotomy of hamstrings had been done with a diagnosis of poliomyelitis, but the deformities returned. When I first saw her, at the age of one and a half years, she had severely contracted hips and knees with sclerosis of the

joint tissues, not sensitive to manipulations, muscles intact but weak, reflexes and sensorium normal. I considered this a congenital condition at the time; it corresponded to nothing I had seen before. I did a tensor-fascia tenotomy and with two stretchings and plaster casts, with difficulty corrected the deformity, and later maintained the correction with braces. When she returned three years later, the child showed other remarkable lesions. A torticollis with no sterno-mastoid spasm marked but reducible; the left elbow ankylosed in mid-flexion; right wrist dislocated anteriorly; both hips dislocated but firm. No joints were inflamed or sensitive even to forcible correction. X-rays show arthritic changes in hips, knees, left elbow, right wrist, with destruction at the epiphysial lines. The neck and other joints are negative. This case had a multiple healed periarthrititis the foci being metaphysial and dormant a long time without evidence of pus anywhere and no signs of arthritis.

Lesions in joints causing deformities and disturbances of uncertain and gradual onset and negative history are the result of a metaphysial infection in infancy.

PROCEEDINGS OF ACADEMY MEETINGS

STATED MEETINGS

SPECIAL NOTICE

There will be no Stated Meeting of the Academy on April 5.

Thursday Evening, April 19, at 8:30 o'clock

- I. EXECUTIVE SESSION
Election of Fellows
- II. SYMPOSIUM: FACTORS THAT PRODUCE PERSONALITY AND MAKE FOR PERSONALITY AND BEHAVIOR PROBLEMS
 - a. Paper by William Healy, Director, Judge Baker Foundation, Boston
 - b. Paper by Lawson G. Lowrey, Director, Institute for Child Guidance
- III. PRESENTATION OF PORTRAIT OF DR. WILLIAM H. PARK
Note: Dr. Park's portrait will be on exhibit at the Academy after April 19.

SECTION MEETINGS

SECTION OF DERMATOLOGY AND SYPHILIS

Tuesday Evening, April 3, at 8:30 o'clock

ORDER

- I. MISCELLANEOUS CASES
- II. DISCUSSION
- III. EXECUTIVE SESSION
Nomination of Officers

Note: Examination of cases is limited to members and their invited guests.

SECTION OF SURGERY

Friday Evening, April 6, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. PRESENTATION OF CASES
 - a. Arthroplasty of the elbow (2), J. J. Westermann, Jr.
 - b. Habitual dislocation of the shoulder treated by the Thomas operation, Clay Ray Murray.
 - c. 1. Intestinal obstruction and multiple fecal fistulae following operation for appendicitis
 - 2. Multiple cysts of the mesentery, Edward W. Peterson
 - d. Chronic intussusception, Fred W. Solley
 - e. Intussusception proven at operation to have been reduced by enema, Grant P. Pennoyer
- III. PAPERS OF THE EVENING
 - a. Intussusception in infancy, Richard W. Bolling
 - b. A study of ganglion with special reference to treatment, Louis Carp, A. P. Stout
- IV. GENERAL DISCUSSION
- V. EXECUTIVE SESSION
Nomination of Officers

SECTION OF NEUROLOGY AND PSYCHIATRY

Tuesday Evening, April 10, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. CLINICAL PRESENTATION:
 - Unusual tumor of the brain with presentation of patient and pathological specimen, Charles A. McKendree, James R. Lisa (by invitation)

III. PAPERS OF THE EVENING

- a. Some unusual tumors of the third ventricle, Percival Bailey
(by invitation)

Discussion, Joseph H. Globus, Walter M. Kraus

- b. Venous dilatations and other anomalies of intra-spinal vessels with
signs and symptoms of cord compression, Joseph H. Globus

Discussion, Bernard Sachs, Israel Strauss, Charles A. Elsberg

IV. EXECUTIVE SESSION

Nomination of Officers

SECTION OF PEDIATRICS

Thursday Evening, April 12, at 8:30 o'clock (promptly)

ORDER

I. PAPERS OF THE EVENING

- a. Actinomycosis of the lung

Report of a case treated by bronchoscopy and lipiodol, F. Elmer
Johnson, John Devereux Kernan

- b. Body mechanics as a fundamental factor in pediatric problems,
Royal Storrs Haynes

Discussion, Frederick Tilney, Russell A. Hibbs, Charles Gilmore
Kerley

II. GENERAL DISCUSSION

III. EXECUTIVE SESSION

Nomination of Officers

SECTION OF OTOTOLOGY

The regular meeting of the Section of Otology will not be held on April
13.

The next meeting will be held jointly with the Section of Laryngology
and Rhinology on Wednesday Evening, April 25. The program will be
published later.

SECTION OF OPHTHALMOLOGY

Monday Evening, April 16, at 8:30 o'clock

I. READING OF THE MINUTES

II. PRESENTATION OF CASES

- a. Anomaly of distribution of vessels on the disc
b. Two cilia in anterior chamber following accident
c. Angioid streaks of the retina, Wendell L. Hughes

III. Lantern slide demonstration. La Grange's operation, Webb W. Weeks

IV. A stage for the demonstration of optical phenomena, Charles W.
Stevens

V. PAPERS OF THE EVENING

- a. 1. The influence of illumination on intra-ocular pressure in normal
and glaucomatous eyes

2. Temporary and permanent disturbance of the dark adaptation in glaucoma, Dorian Feigenbaum, Chief Ophthalmologist Eye Hospitals of Jerusalem (by invitation)
- b. Visual acuity, Selig Hecht, Prof. of Biophysics Columbia University (by invitation)

VI. EXECUTIVE SESSION

Nomination of officers

SECTION OF MEDICINE

Tuesday Evening, April 17, at 8:30 o'clock

ORDER

I. PAPERS OF THE EVENING

- a. Stimuli causing pain in gastric ulcer, Franklin Stevens (by invitation)
Discussion by Fordyce B. St. John
- b. Causation of angina pectoris, William H. Resnik
Discussion by Lewis A. Conner
- c. Medicine in industry, E. H. L. Corwin, Ph.D.

II. EXECUTIVE SESSION

Nomination of officers

SECTION OF GENITO-URINARY SURGERY

Wednesday Afternoon, April 18, 2:30-5:00 o'clock

Operations and Demonstrations by the Department of Urology, at N. Y. Post-Graduate Medical School and Hospital, 20th Street and Second Avenue.—Joseph J. McCarthy, Clarence G. Bandler, George F. Cahill, Stanley R. Woodruff, Joseph A. Hyams, Robert N. Severance (by invitation), J. Sidney Ritter, C. Travers Stepita

At the Academy

Wednesday Evening, April 18, at 8:30 o'clock

I. PRESENTATION OF CASES

(From the Service of New York Post-Graduate Medical School and Hospital)

- a. Diagnostic cystograms, J. Sidney Ritter
- b. Aberrant blood vessels as factors in ureteral obstruction, Joseph A. Hyams
- c. Solitary cyst of the kidney, Stanley R. Woodruff
- d. Absence of right kidney and infection of upper portion of left fused kidney:—heminephrectomy, Stanley R. Woodruff
- e. Two cases of sarcoma of the bladder, C. Travers Stepita
- f. Bladder paralysis due to non-tabetic spinal cord lesions, George F. Cahill
- g. Chemical blood changes produced by obstructive lesions of the urogenital tract. Clarence G. Bandler, John A. Killian, Ph.D. (by invitation), M. B. Johnston, A.B. (by invitation)

- h. Horseshoe kidney, multiple calculi in left pelvis
- i. Renal, ureteral, vesical and impacted urethral calculi, simultaneously in same patient, Stanley R. Woodruff
- II. Preliminary report of an improved visualized punch operation, Joseph F. McCarthy
- III. EXECUTIVE SESSION
Nomination of officers

SECTION OF ORTHOPEDIC SURGERY

Friday Evening, April 20, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. CASE PRESENTATIONS AND TECHNICAL DEMONSTRATIONS
 - a. Radiographic demonstration of fractures of the neck of the femur. Lantern slides, H. B. Philips
 - b. Apparatus for reducing fracture dislocation of the cervical spine, Joseph E. J. King
 - c. Extra articular arthrodesis for tuberculosis, followed later by arthroplasty, Fred H. Albee
- III. PAPERS OF THE EVENING
 - a. Bursitis of the foot—a neglected cause of disability, Percy W. Roberts
 - b. Deformities following epiphysitis in infancy, Edgar S. Oppenheimer
- IV. EXECUTIVE SESSION
Nomination of officers

SECTION OF OBSTETRICS AND GYNECOLOGY

Tuesday Evening, April 24, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. PAPERS OF THE EVENING
 - a. Further observations on the value of the complement fixation test in gonorrhea in women, Emily Dunning Barringer
Discussion by John O. Polak, Anna W. Williams, Archibald McNeil (by invitation), Edward L. Keyes
 - b. Acute appendicitis and acute initial salpingitis: a differential point, James V. Ricci (by invitation)
Discussion by Edward W. Pinkham
 - c. A study of eighty repeated laparo-trachelotomies (with lantern slides), Joseph B. De Lee, Northwestern University, Chicago (by invitation), J. P. Greenhill (by invitation), Luella Nadelhoffer (by invitation)
 - d. A presentation of motion pictures to show their value in the teaching of obstetrics and in reporting clinical cases, Joseph B. De Lee (by invitation)

III. GENERAL DISCUSSION

IV. EXECUTIVE SESSION

Nomination of officers

COMBINED MEETING

SECTIONS OF OTOTOLOGY, AND LARYNGOLOGY AND RHINOLOGY

Wednesday Evening, April 25, at 8:30 o'clock

ORDER

I. PAPERS OF THE EVENING

- a. The laboratory aids in otology, Samuel J. Kopetzky
Discussion by Thomas J. Harris, Reuben Ottenberg, Joseph R. Losee, Max A. Goldzieher (by invitation)
- b. The significant effect of paranasal sinusitis on certain chiasmal tumor syndromes, H. L. Lillie, The Mayo Clinic (by invitation)
Discussion, Wells P. Eagleton, Bernard Sachs, John M. Wheeler

II. EXECUTIVE SESSION

Nomination of officers

PRESENTATION TO THE NEW YORK ACADEMY
OF MEDICINE OF THE PORTRAIT OF
WILLIAM HALLOCK PARK, A.B., M.D., Sc.D., LL.D.

PRESENTED AT THE STATED MEETING OF APRIL 19, 1928

Dr. Rowland G. Freeman, Chairman of the Committee in charge of the painting of the portrait, represented the donors in its presentation, in the following remarks:

I feel greatly honored in presenting to The New York Academy of Medicine this portrait of William Hallock Park, A.B., M.D., Sc.D., LL.D., Director of Laboratories of the Department of Health of the City of New York, Professor of Bacteriology and Hygiene in the New York University and Bellevue Hospital Medical School; and Vice-President of the New York Academy of Medicine.

I have known Dr. Park since our medical school days, and have always been much impressed, not only by his sound judgment and critical attitude, but by his universal courtesy and consideration for every one with whom he came in contact.



WILLIAM HALLOCK PARK
(Photograph of Portrait)

Dr. Park has not only accomplished much important research himself, but has kept well abreast with research everywhere, and has had the exceptional ability to pick out the valuable work, and to make practical application of it to public health purposes.

It would be impossible, in the short time at my disposal, to go over the important work that Dr. Park has accomplished for science, for public health, and for the health of New York City.

The first investigation that called public attention particularly to him was the method he promulgated for the early diagnosis and isolation of cases of diphtheria. At that time diagnosis was only made by cultures on Petrie plates. Dr. Park demonstrated the value and reliability of test tube culture diagnosis which has now been universally adopted.

He was also the first to utilize the Schick test to demonstrate the value of toxin-antitoxin for immunization, having proved its value to urge its general use. Under his supervision more than half a million children in the City have been immunized against diphtheria.

He was also the first to utilize the Schick test, and toxin-antitoxin for immunization, and under his supervision more than half a million children in the City have been immunized against diphtheria.

He has made extensive studies in scarlet fever and measles, and has provided the City and other places with bacteriological products. At the beginning of the war these New York products were in great demand.

Dr. Park has shown us that influenza is not due to the influenza bacillus.

The danger of impure milk was emphasized by him, and he introduced the bacteriological standard for city milk supplies.

A very important investigation was that which he undertook to determine the age, frequency and location of bovine

as contrasted with the human type of tuberculosis. Dr. Theobald Smith had just demonstrated the cultural differentiation of the two types, and Dr. Park with Dr. Krumwiede investigated several hundred specimens of tuberculous tissue and showed the usual distribution of bovine tuberculosis in children and the absence of this type in adult life.

Again, also in connection with milk, he took up the subject of commercial pasteurization. Such pasteurization formerly was used by milk producers and milk dealers to prevent dirty milk from souring before it could reach the consumer. For this purpose the milk was passed through pipes in an apparatus, one part of the pipe being heated so as to momentarily produce a high temperature in the milk. Dr. Park introduced into dairy plants in New York the holding process of milk pasteurization, in which the milk was subjected to a pasteurizing temperature, not a sterilizing temperature, for thirty minutes.

He also showed, in a large investigation, that babies fed on pasteurized dirty milk did not do as well as those fed on pasteurized clean milk.

It is due to the efforts of Dr. Park and his distinguished predecessor, Dr. Hermann M. Biggs, that New York City has an enviable reputation as a center of sound and advanced public health application. Not only has he accomplished all this, but he has trained workers who have carried out his ideas and methods in various other cities of the world. He has, moreover, obtained such a reputation that, with the various changes of administration, there has never been, as far as I know, any serious effort made to deprive the City of his valuable work.

In presenting this portrait I want to give all the credit for its being here to Dr. Annis E. Thomson, for while the late Mrs. Stella Boothe Vail conceived the idea, Dr. Thomson obtained the money, selected one whom we believe to have been an excellent artist for the purpose, and did all this with such good spirit and enthusiasm as to elicit the admiration of all those who were interested.

I am glad to be able to present to The New York Academy of Medicine, in behalf of the Committee and the friends of Dr. Park who were contributors, this excellent portrait by Johansen, of one of our most distinguished members.

ACCEPTANCE BY DR. SAMUEL W. LAMBERT

PRESIDENT OF THE ACADEMY

Dr. Freeman, Members of the Academy and Guests: It gives me great pleasure to accept this portrait of Dr. Park who at present holds the office of one of our Vice-Presidencies of the Academy. There is very little to add to Dr. Freeman's resumé, as to what Dr. Park stands for in this City. He has done so many things so well, and so quietly, that his presence, although an influence upon the lives of every one, is not always appreciated.

He put New York City in the first rank, first among the cities which had laboratories for scientific work and scientific diagnosis. His work was not always as easy to introduce as it is now easy to carry on. And he has had his troubles which he has overcome very successfully, so that every one, I think, and every member of the profession, some of whom are not always in sympathy with his work, now feel that the New York City Board of Health and its laboratories are not only a desirable, but a most necessary part of a civic contest against disease and the development of public health in this community. I, therefore, accept this portrait with great pleasure, and it will be placed upon the walls of the Academy where it can be seen after it has been put on public view for a few weeks, immediately after this meeting to-morrow.

PUBLIC HEALTH RELATIONS COMMITTEE SUMMARY OF ACTIVITIES

OF THE EXECUTIVE COMMITTEE MONTHS OF MARCH AND APRIL 1928

Among the numerous activities of the Public Health Relations Committee during the months of March and April, the following are of particular interest:

1. *Conference on the Nomenclature of Diseases*

A conference on the Uniform Nomenclature of Diseases was held under the auspices of the Public Health Relations Committee at which representatives of several national and local medical organizations were present, as well as representatives of the United States Census Office, United States Public Health Service, and the medical departments of the Army and Navy.

The object of the conference was to discuss the need and feasibility of a nomenclature which would secure general acceptance and usage throughout the United States. The conference resolved to proceed with the suggestions made, and to call on the several national medical bodies to coöperate by appointing committees to aid in preparing, in coöperation with the Census Bureau, a classification which would be generally acceptable, and which would be in an abridged form practicable for usage in various connections.

The conference elected Dr. Haven Emerson, as President, Dr. E. H. L. Corwin, Secretary and Dr. George Baehr, Chairman of the Executive Committee; other members of the Executive Committee are Drs. Dana W. Atchley, Van Horne Norrie, William H. Davis of the Division of Vital Statistics of the U. S. Census Office and Mr. George H. Van Buren of the Statistical Department of the Metropolitan Life Insurance Company.

2. *Poliomyelitis Convalescent Serum*

With the possible increase in the prevalence of Poliomyelitis, the Committee considered ways and means of providing for a supply of serum from patients who have had the disease with a view of making it available for administration to suitable cases.

A small sum of money has been secured as a revolving fund for the supply of serum. The details of administration are under consideration.

3. *Training of Nurses in Operating Room Technique*

The attention of the Committee on Public Health Relations has been called to the existing provision with regard to the training of nurses in operating room technique, and to the need of changing the regulation of the State Department of Education concerning this training in the interest of the safety and welfare of patients.

After an inquiry into the subject, this Committee sent the following suggestions to the State Department of Education with regard to a change in the present regulations.

It goes without saying that all nurses should have training in asepsis, and that only in the operating room can this technique be adequately acquired. The recommendations of the Committee are:

First, that the present regulation of requiring a pupil nurse to assist at 25 *major operations* is unwise, as the necessary training in asepsis can be obtained on *minor surgical cases*.

Second, the Committee is of the opinion that training in asepsis should be given as early as possible in the career of a pupil nurse. It may be a desirable procedure to provide the experience in the operating room early in the course of training so that the nurse in the wards would be impressed from the very start with the dangers of slipshod methods in dealing with the sick.

And third, all novices in the operating room should be thoroughly supervised and constantly controlled by an experienced graduate nurse.

4. *Work at Willard Parker Hospital*

Since its organization in 1911, the Public Health Relations Committee of The New York Academy of Medicine has given attention to the needs of the contagious disease hospitals of the City.

The first study the Committee undertook in 1911, was in relation to these hospitals, and subsequently at intervals of several years, complete or partial surveys of these hospitals were made. As a result of these inquiries, recommendations were drafted which were submitted to the City authorities, and many changes in administrative methods and statistical accounting have been introduced.

It is therefore with particular gratification that the Committee looks upon the progress made in conditions attendant upon the care of patients at the Willard Parker Hospital. The progress made during the last five years has been particularly striking. While in 1922 the general mortality of patients at the Willard Parker Hospital was 16.7 per cent., it was only 7.3 per cent. in 1927.

The mortality from diphtheria during this period fell from 18.1 per cent. to 9 per cent. and the number of intubation cases decreased from 14.2 per cent. of all the diphtheria cases to 4.5 per cent. Coincident with the reduction in intubation cases was the decrease in fatality attendant upon this procedure. While the death rate in intubation cases was 54 per cent. in 1922, it was reduced to 16.6 per cent. in 1927. Furthermore, the chronic tube cases no longer exist as a problem.

The mortality from measles fell from 22.4 per cent. in 1922 to 9 per cent. in 1927, and that of scarlet fever from 8.3 per cent. to 2.3 per cent.

While many factors have entered into the lowering of mortality of the several diseases during this period, the

striking fall in the rates at the Willard Parker Hospital must be definitely related to the reorganization which has taken place since 1923. The remarkable improvement throughout has taken place since the assumption of the direction of the medical work at Willard Parker Hospital by Dr. Arthur W. Bingham, as Chairman of the Medical Board, and since the appointment of Dr. Shirley W. Wynne, as Administrative Director of the Bureau of Hospitals of the Department of Health. Recognition is due to their services as well as to those of the entire medical and nursing staff of the Hospital and to the whole-hearted support given by the Commissioner of Health.

Other matters considered were:

- a. Medicine in Industry
 - b. Open Hospitals
 - c. Condition of the city streets
 - d. Provision for drug addicts
- and a number of other subjects.

ANNOUNCEMENTS

At its April meeting the Council approved of a special meeting of the Academy to be held in Hosack Hall on May 9, on the subject of Out-of-Door Cleanliness, and of a dinner being given by the Committee on Public Health Relations to Sir Leslie Mackenzie of Scotland in June.

COMMITTEE ON MEDICAL EDUCATION

PRACTICAL LECTURE SERIES—1928-29

TENTATIVE SCHEDULE

The third series of afternoon practical lectures of the Academy will comprise twenty lectures beginning in November. The following subjects have been selected for the series:

The serum treatment and its evaluation in lobar pneumonia. Jesse G. M. Bullowa

Carcinoma of the larynx. John Edmund Mackenty

The common affections of the colon: their origin and their management. John Leonard Kantor

Clinical types of hypotension. Alfred Friedlander, Cincinnati, Ohio

Certain medical complications of pregnancy and their treatment. Wm. W. Herrick

Management of spastic constipation and mucous colopathy in vagotonic persons. Lewellys F. Barker, Baltimore

The antitoxin treatment of erysipelas. (Lantern demonstrations). Konrad E. Birkhaug, Rochester, N. Y.

The allergic diseases as encountered by the general practitioner. William W. Duke

Control of conception—present and future. Robert L. Dickinson
Rheumatic fever. Homer F. Swift

Carcinoma of the colon and rectum. Daniel F. Jones, Boston

Diarrhœa and dehydration in young infants. Oscar M. Schloss

Diseases of the prostate. Hugh H. Young, Baltimore

Affections of the valves of the heart. Emanuel Libman

Medico-legal questions of interest to the general practitioner. Charles Norris

Epidemic encephalitis. Frederick Tilney

Burns and their treatment Frederic Bancroft

Abscess of the lung. Harry Wessler

The medical examination. Harlow Brooks

Psycho-analysis and the general practitioner. Louis Casamajor

NOTES

STREETER COLLECTION ACQUIRED

Dr. E. C. Streeter of Boston sold his valuable collection of medical incunabula and classics to a well-known book dealer in New York about the end of the year 1927. The knowledge of this sale came to the attention of some of the members of the Library staff and the Council in a few days, and excited a great deal of comment and interest.

During the month of February the books were brought to New York and were examined by the President of the Academy, the Librarian, and others who were interested in this unusual type of medical publication.

At the February meeting of the Council a resolution was adopted which expressed the Council's earnest desire to obtain these books for the Academy. They are being held for the Academy at the price of \$185,000.

Dr. Rosenbach, the dealer in question, has made a number of additions of unusual medical classics and the entire Collection comprises about 1700 volumes. Among them are the following important specimens:

1. Eighty-three medical incunabula, or books printed before 1501. Of some of these books only a very few copies are known and in one instance the book is unique or, in other words, until now no other copy has been recorded.
2. A beautiful illuminated Guy de Chauliac (1300-1368) manuscript in English which is said to have been made for John of Gaunt. It dates from the last quarter of the XIVth century and Quaritch, the well-known London bookseller, whose hands it passed through, described it as "one of the finest English medical manuscripts in existence." It is almost certain this MS. is alone worth twenty-five thousand dollars.
3. The works of the early anatomists. One of these is that of Berengarius who is said to have been the first to make anatomical plates from nature.
4. The rare *Epitome* of Vesalius which was issued before the *De fabrica humani corporis* of which latter there are 1st (1543),

medical science, and the following Committee has been appointed to work out the details of the method of award and the selection of the artist:

Dr. Walter J. MacNeal
 Dr. Walter L. Niles
 Dr. Walter W. Palmer
 Dr. Francis Carter Wood
 Dr. D. D. Van Slyke

The Council adopted a resolution congratulating Mr. Felix Wesstrom who on March 28, 1928, completed thirty-five years of loyal service to the Academy.

THE NEW YORK ACADEMY OF MEDICINE MEDAL

Dr. Samuel McCullagh, feeling that the medical profession has never recognized in a tangible manner outstanding achievements of physicians, wrote to the President of the Academy offering to donate a medal to the Academy and sufficient endowment to award it at infrequent intervals, for unusually distinguished service in medicine. This offer was reported to the Council at its meeting on February 15 and the President was authorized to appoint a special Committee to consider the matter. Doctors Niles, Palmer, Wood, Van Slyke and MacNeal were asked to serve in this capacity.

A meeting of the Committee was held and the Committee then recommended that the Council accept Dr. McCullagh's offer and award The New York Academy of Medicine Medal at intervals of not oftener than three to five years, and that the medal be awarded not only for specific scientific discovery but also in recognition of the general career of a physician who had contributed in a distinguished way to the progress of medicine.

The Council approved of these recommendations.

Subsequently an artist submitted plaster casts of a design for the proposed medal and an announcement will be made when the design has been decided upon. The Fellows

will also be informed later as to the probable date of the first award of the medal.

EXHIBITION OF WORKS IN THE PLASTIC AND GRAPHIC ARTS
BY AMERICAN PHYSICIANS UNDER THE AUSPICES OF
THE NEW YORK PHYSICIANS ART CLUB

Held at The New York Academy of Medicine, April 1st to 15th, 1928.

This is a second effort of the New York group in putting on public view, the work of contemporary American physicians in the plastic and graphic arts. That the first effort succeeded in arousing the interest of the profession, is evidenced by several physicians art exhibitions which have recently been held in other cities in this country and by the many new names in the present catalogue.

One of the things lacking in medical education is that phase of learning known as liberal, cultural or humane. Not only do many students lack this training, but a large number do not even know the meaning of the terms. An apt illustration, in a recent article in the *Edinburgh Review*, furnishes this definition as follows: A man is cast away on a desert island,—his first care is to find food; his next shelter; and he will have to be less than human if, after these are obtained, he does not wish to explore the island around him: this exploration supplies or rather is a liberal education." The pursuit of art, then, to which this Society of doctors has devoted itself is in a peculiar sense the quest of a liberal education.

"All passeth:

Art alone outlasteth all.

The carven stone

Survives the City's fall.

The hard wrought coin or bust

That ploughmen find

May call to mind

Old Empires changed to dust.

The Gods themselves must die

But Sovereign Rhyme

May still defy

The ravennings of time."

There is another phase to the significance of the activities of the members of the medical profession in the domain of art. The physician, concerned as he is, in his daily work with the grim realities of life, with misfortune and suffering, finds a release in the pursuit of art. The present exhibition, as did the first, speaks of the love of nature and of the joy in expressing the beauty of the human form.

It is to be hoped that these exhibitions will become regular annual events. They will go far in stimulating the efforts of the profession towards cultural betterment.

GEORGE D. STEWART

FELLOWS ELECTED APRIL 19

Ralph Almour, M.D.....51 West 73rd St
 Leslie Orrell Ashton, M.D.....80 East 77th St.
 Carl A. L. Binger, M.D.....151 East 92nd St.
 William H. Bishop, M.D.....667 Madison Ave.
 Alexis Carrel, M.D.....Rockefeller Institute
 C. Floyd Haviland, M.D.....Ward's Island
 Harold Herman, M.D.....296 Central Park West
 Alvin Edgar Kuhlmann, M.D.

527 37th St., Union City, N. J.

Joseph F. Londrigan, M.D.

325 Washington St., Hoboken, N. J.

Arthur S. McQuillan, M.D.177 East 71st St.
 Lewis Knode Neff, M.D.....1213 Park Ave.
 Ray S. Nelson, M.D.....614 Park Ave.
 Alfred Plaut, M.D.....4028 Eighth St., Bayside, L. I.
 Dudley D. Stetson, M.D.....614 Park Ave.
 George Thomas Strodl, M.D.....52 East 80th St
 Henry Lyle Winter, M.D.....80 West 40th St.

AND FOR ASSOCIATE FELLOWSHIP

William B. Dunning, D.D.S.....140 East 80th St.
 Leroy L. Hartman, D.D.S.....30 East 40th St.
 Francis S. McCaffrey, D.D.S.....2170 University Ave.
 Chester Newton Myers, Ph.D.....34 Cedar Pl., Yonkers
 Hassow O. von Wedel, Sc.M., Sc.D....Ardsey-on-Hudson

LIBRARY NOTES

RECENT ACCESSIONS

- Abstract of the proceedings of the thirty-eighth annual meeting of the Association of life insurance medical directors of America, 1927.
- Aikens, C. A. Clinical studies for nurses. 6. ed.
Phila., Saunders, 1928. 607 p.
- v. Baer, K. E. Ueber die Bildung des Eies.
Leip., Voss, 1927. 47 p.
- Bang, I. Mikromethoden zur Blutuntersuchung. 6 Aufl.
München, Bergmann, 1927. 54 p.
- Barker, Sir H. A. Leaves from my life.
Lond., Hutchinson, 1927. 319 p.
- Benda, R. Das reticulo-endotheliale System in der Schwangerschaft.
Berlin, Urban, 1927. 75 p.
- Berry, R. J. A. Brain and mind.
N. Y., Macmillan, 1928. 608 p.
- Blyth, A. W. & Blyth, M. W. Foods. 7. ed.
Lond., Griffin, 1927. 619 p.
- Broman, I. Die Entwicklung des Menschen vor der Geburt.
München, Bergmann, 1927. 351 p.
- Burrow, T. The social basis of consciousness.
N. Y., Harcourt, 1927. 256 p.
- Cameron, A. T. A textbook of biochemistry.
Lond., Churchill, 1928. 462 p.
- Chetwood, C. H. Practice of urology. 4. ed.
N. Y., Wood, 1927. 879 p.
- Claoué, C. Oreille interne.
Paris, Maloine, 1928. 225 p.
- Coriveaud, A. Le lendemain du mariage. 5. éd.
Paris, Baillière, 1927. 270 p.
- Dana, C. L. The peaks of medical history. 2. ed.
N. Y., Hoeber, 1928. 105 p.
- Davis, J. W. Notes on bacteriology.
Charlotte, N. C., Queen city pub. co., 1927. 85 p.
- De Lee, J. B., The principles and practice of obstetrics. 5. ed.
Phila., Saunders, 1928. 1140 p.
- Evans-Wentz, W. Y. The Tibetan book of the dead.
Lond., Oxford pr., 1927. 248 p.
- Fischer, L. The health-care of the baby. 17. ed.
N. Y., Funk, 1928. 248 p.
- Flagg, P. J. The art of anaesthesia. 4. ed.
Phila., Lippincott, 1928. 384 p.
- Fortune, R. F. The mind in sleep.
Lond., Kegan Paul, 1927. 114 p.

- Galup, J. & Ségard, M. *Pathogénie et traitement de l'asthme.*
Paris, Doin, 1927. 262 p.
- Gilis, P. *Anatomie élémentaire des centres nerveux et du sympathique chez l'homme.*
Paris, Masson, 1927. 232 p.
- Green, G. H. *The terror-dream.*
Lond., Kegan Paul, 1927. 126 p.
- Guillaume, A. C. *Les radiations lumineuses en physiologie et en thérapeutique.*
Paris, Masson, 1927. 515 p.
- Handbuch der Lichttherapie.* Hrsg. von W. Hausmann & R. Volk.
Wien, Springer, 1927. 444 p.
- Häupl, K. *Paradentitis marginalis.*
Oslo, Fabritius, 1926. 320 p.
- Hazzard, L. B. *Scientific fasting.* 5. ed.
N. Y., Grant, 1927. 360 p.
- Henderson, Y. & Haggard, H. W. *Noxious gases.*
N. Y., Chem. cat. co., 1927. 220 p.
- Hollender, A. R. & Cottle, M. H. *Physical therapy in diseases of the eye, ear, nose and throat.*
Lond., Churchill, 1926. 307 p.
- Hollingworth, H. L. *Psychology.*
N. Y., Appleton, 1928. 539 p.
- Hovelacque, A. *Anatomie des nerfs craniens et rachidiens et du système grand sympathique chez l'homme.*
Paris, Doin, 1927. 2 vols.
- Hutchison, R. *Food and the principles of dietetics.* 6. ed.
N. Y., Wood, 1927. 610 p.
- Hyslop, T. B. *Mental handicaps in art.*
Lond., Baillière, 1927. 97 p.
- Kayser, H. *Tabelle der Hauptlinien der Linienspektren aller Elemente.*
Berlin, Springer, 1926. 198 p.
- Klieneberger, C. *Die Blutmorphologie der Laboratoriumstiere.* 2. Aufl.
Leip., Barth, 1928. 136 p.
- Knipping, H. W. & Kowitz, H. L. *Klinische Gasstoffwechseltechnik.*
Berlin, Springer, 1928. 193 p.
- Knowles, R. *An introduction to medical protozoology.*
Calcutta, Thacker, 1926. 887 p.
- Kubányi, E. *Die Bluttransfusion.*
Berlin, Urban, 1928. 127 p.
- Kuczynski, M. H. *Die Erreger des Fleck- und Felsenfiebers.*
Berlin, Springer, 1927. 256 p.
- Lewin, C. *Die Aetiologie der bösartigen Geschwülste.*
Berlin, Springer, 1928. 231 p.
- Loew, O. *Der Kalkbedarf von Mensch und Tier.* 4. Aufl.
München, Gmelin, 1927. 101 p.

- Luger, A. Grundriss der klinischen Stuhluntersuchung.
Wien, Springer, 1928. 341 p.
- MacKenna, R. W. Diseases of the skin. 2. ed.
Lond., Baillière, 1927. 452 p.
- Maendl, H. Die Kollapstherapie der Lungentuberkulose.
Wien, Springer, 1927. 206 p.
- May, C. H. Manual of the diseases of the eye. 12. ed.
N. Y., Wood, 1927. 445 p.
- Myerson, A. The psychology of mental disorders.
N. Y., Macmillan, 1927. 135 p.
- Newbold, W. R. The cipher of Roger Bacon.
Phila., Univ. of Penn. pr., 1928. 224 p.
- Pauchet, V. & Tierny, A. La gastro-entérostomie.
Paris, Doin, 1926. 200 p.
- Proceedings of the world population conference. . . Geneva, Aug. 29.-Sept. 3, 1927.
Lond., Arnold, 1927. 383 p.
- Report of the first annual conference of committees of the World conference on narcotic education and International narcotic education association. N. Y., Nov. 3-6, 1927.
[Wash. 622 Southern bldg.] 125 p.
- Roberts, J. G. Manual of bacteriology and pathology for nurses. 5. ed.
Phila., Saunders, 1928. 235 p.
- Schanz, A. Praktische Orthopädie.
Berlin, Springer, 1928. 560 p.
- Schellberg, O. B. Mechanics and chemistry of the human body.
N. Y., Schellberg inst., 1928. 44 p.
- Schoen von Wildenegg, E. Blut und Gravitation.
Berlin, Fischer, 1928. 68 p.
- Special cytology. . . Ed. by E. V. Cowdry. 2 vols.
N. Y., Hoeber, 1928.
- Stieve, H. Der Halsteil der menschlichen Gebärmutter.
Leip., Akad. verl. Gesell., 1927. 151 p.
- Transactions of the American laryngological association, 1927.
- Unna, P. G. Histochemie der Haut.
Leip., Deuticke, 1928. 163 p.
- Veit, J. Handbuch der Gynäkologie. 3. Aufl. Hrsg. von W. Stoeckel.
München, Bergmann, 1927. 3 vols.
- Verne, J. Les pigments dans l'organisme animal.
Paris, Doin, 1926. 608 p.
- Walsh, J. J. Laughter and health.
N. Y., Appleton, 1928. 197 p.

HOURS FOR NON-FELLOWS

At a regular meeting of the Council held on April 25, it was moved and duly carried that the Library of the Academy should be open to non-Fellows until 5 p.m. each week day.

ANNOUNCEMENT

From June 15 to September 15 the Library will be open on Wednesday evenings until 10:30; on other days the Library will close at five o'clock.

DEATHS OF FELLOWS OF THE ACADEMY

EDWARD LEONARD BULL, M.D., 124 East State Street, Ithaca, New York; graduated in medicine from the College of Physicians and Surgeons, New York City, in 1888; elected a Fellow of the Academy, January 7, 1897; died, December 17, 1927. Dr. Bull was a Fellow of the American Medical Association, a Fellow of the American College of Surgeons, and a member of the American Academy of Ophthalmology and Oto-Laryngology and the Otological, Rhinological and Laryngological Memorial.

CLYDE ELLSWORTH FORD, M.D., 2417 Prospect Avenue, Cleveland, Ohio; graduated in medicine from the Medical Department of Ohio Wesleyan University in 1902; elected a Fellow of the Academy, January 4, 1918; died, February 19, 1928.

JULIUS HALPERN, M.D., 16 East 96th Street, New York City; graduated in medicine from the Military Medical Academy of St. Petersburg, Russia, in 1881; elected a Fellow of the Academy, March 1, 1917; died, March 24, 1928. Dr. Halpern was a Fellow of the American Medical Association and a member of the National Tuberculosis Association.

THOMAS ARMSTRONG KING, M.D., 139 Lexington Avenue, New York City; graduated in medicine from the University of Vermont in 1888; elected a Fellow of the Academy, November 6, 1902; died, April 17, 1928.

BULLETIN OF THE NEW YORK ACADEMY OF MEDICINE

VOL. IV.

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No. 6

PAPERS DELIVERED AT STATED MEETINGS

Symposium on Alcohol, February 2, 1928

I.

ALCOHOL—ITS PUBLIC HEALTH ASPECTS, ITS ABUSES AND USES

CHARLES NORRIS

Chief Medical Examiner, New York City

I little realized in accepting the invitation to address you to-night upon "Alcohol in Relation to the Public Health, Its Uses and Abuses" how hazardous a subject it is. At times I have been panic-stricken at the difficulty of the undertaking.

Alcohol in itself is inflammable and recent events bear me out in this statement. The consumption of alcohol has always been accompanied with grave social consequences. It is no recent subject. The drinking of alcohol derived from natural fermentation has Biblical sanction. Its use by Christian people has been universal throughout the ages. Restriction of the use of alcohol, except in Moham-medan countries, may be said to have originated less than a century ago and in this country.

Prohibition, first established nationally as a war measure, has created in our country a situation wholly deplorable. The arguments advanced for and against prohibition have become cloaked in a dress of false statements, which may be best described as grotesqueries of fancy without solid foundation or adequate investigation of the facts. Alcohol has become almost a political issue, both parties jockeying at the start of their political conventions. This

is most unfortunate. *Salus populi suprema lex* in all the discussions that I have seen has been completely overlooked and forgotten. This, in my opinion, is the supreme issue.

Alcohol, briefly, is a product of the fermentation of a large variety of substances which contain starch or sugar. It is a natural product which arises during fermentation outside of the body as well as in the bodies of all animals including man.

Let us confine ourselves to the medical aspects of the subject. First, the action of alcohol on man. In a book entitled "The Action of Alcohol on Man" by Ernest H. Starling, of the University College, London, with his associates, Robert Hutchinson, Sir Frederick W. Mott and Raymond Pearl, a complete resumé is given of the physiological and the pathological relations of alcohol to medical problems and mental disorders and of the relation of alcohol to mortality. It is impossible to review this model book even briefly.

From a chapter entitled "The Fate of Alcohol in the Body," the following statements may be quoted: "Alcohol taken into the stomach is rapidly absorbed, both from this cavity and from the small intestine, absorption being complete in from half an hour to two hours. Absorption takes place into the blood stream by which it is carried to all parts of the body and is more or less evenly distributed throughout. Alcohol undergoes no change either under the action of the digestive juices or in the process of absorption. The amount in the blood and tissues after absorption is complete therefore varies with the size or dose which has been taken. The rate of absorption is more rapid when the alcohol is administered in a strong solution and on an empty stomach. It is slowed by dilution of the alcohol and by its administration along with or shortly after food. Milk is especially efficacious in slowing this absorption. The alcohol after attaining its maximum concentration gradually diminishes in amount. The rate of diminution is not altered by increasing the dose so that the bigger the

dose the longer is the time necessary to free the body entirely from alcohol. Only a very small proportion of the alcohol is excreted by the breath and kidneys unchanged. This may amount, for small doses, to 2 per cent. of the total alcohol taken and never exceeds 10 per cent. The disappearance of alcohol from the blood is due to its complete oxidation in the tissues. In one of Mellanby's experiments, after the administration of 50 c.c. of alcohol to a dog, oxidation took place at the rate of 2.5 c.c. of alcohol per hour. In an experiment on a man of 70 kilos, Mellanby found that after the administration of 150 c.c. in the form of whiskey, 10 c.c. of alcohol were oxidized each hour, so that it would require 17 hours to free his body from a dose of this size (170 c.c. absolute alcohol would be equivalent to about three-quarters of a pint of undiluted whiskey)."

It has been strenuously denied that whiskey is a food. Alcohol is a food but, although it may be used as a source of energy to the body, it is not useful for the purposes of repair. While the fats and carbohydrates serve to make good the store depots, proteins are necessary to replace the losses of the working tissues by wear and tear. It has been estimated that one gram of carbohydrate yields 4 calories, one gram of protein 4 calories, one gram of fat 8.9 calories. The caloric value of one gram of alcohol is 7 calories.

It should be possible in an animal neither gaining nor losing weight to replace say 70 grams of carbohydrate in the diet by 40 grams of alcohol and find the evolution of energy by the body, the rate of combustion and the weight of the body, unchanged. "On the other hand, if 40 grams of alcohol be added to the diet in such circumstances, so that the man is now taking 40 times 7 equals 280 calories per day more than he was before, the combustion of the alcohol should preserve some of the fat or carbohydrate from oxidation, since the energy demands on the body are not increased. The fat or carbohydrate remaining in the body, which is thus spared from oxidation, will be stored for the most part in the form of fat, so that the body weight should be increased and the respiratory exchanges should

show us that this increase is due to the storing up of fat or possibly, to a small extent, of animal starch or glycogen.

"Abundant evidence is presented that alcohol is injurious in its effects, either when taken in moderate doses or when taken repeatedly in excess over a long period of time; that this effect is exacerbated if alcohol is taken in strong concentration so as to damage the lining membrane of the alimentary canal and thus set up all kinds of secondary disorders depending on the absorption of the toxic products of digestion. Chronic alcohol excess produces not only specific nervous disorders, such as delirium tremens, etc., but also a progressive deterioration of the mental and moral qualities of the individual, while the effect of alcohol on the tissues diminishes the powers of resistance to infection, his reaction of self-protection, and by its action on the reproductive cells, tends to the elimination of the stock from the community. It has been shown that 12 c.c. of alcohol when given on an empty stomach occasionally produces an effect in diminishing powers of muscular co-ordination and other complex neural processes but that in nearly all cases the effects in such a dose are unappreciable when taken with a meal. Twelve c.c. correspond to a glass of beer or a wine-glass of claret, so that our conclusion must be that alcohol taken on an empty stomach will tend, if only slightly, to depreciate an individual's powers of performance, but that a glass of wine or beer taken with his lunch will not interfere with the carrying out of his afternoon's work. When the work of the day is finished, a greater freedom in the use of alcohol is permissible. Thirty-five c.c. of alcohol produces nearly in all cases effects on muscular co-ordination and performance which cannot be measured but would not influence a man's behavior or his powers of comporting himself with propriety as a member of society.

"Thirty-five c.c. of absolute alcohol are contained in half a bottle of light wine, claret or hock, in a pint and a half of ale, 3 ounces of whiskey (30 underproof), or in a quarter of a bottle of port. Moreover, 35 c.c. of alcohol would

only undergo complete oxidation in the body within three and a half to five hours, so that if this amount is taken with the evening meal the alcohol will have disappeared from the blood and the body tissues many hours before it is necessary to get up in the morning and commence the work of the day. Such quantities could be taken throughout adult existence without interfering with bodily health or fancy, and are sufficient to attain the beneficial results and to produce the increased pleasure in living, which are the objects of the employment of alcoholic beverages. It is probable that a man's quota could be doubled on occasion, but it must be remembered that 70 c.c. of alcohol will take at least seven hours for its complete oxidation in the body and during sleep may require ten or twelve, so that in all probability a man who has thus indulged will not be at his best when he arises the following morning."

Is alcohol a medicine? A consideration of this aspect of alcohol at this time is, in my opinion, needless. The subject was so tersely and admirably presented only some weeks ago in this hall by our President and others, that I need say only a few words. The masters of medicine before prohibition have used alcohol in all its forms, and have been strong advocates of alcohol in medicine. The master minds, such as Delafield, Janeway, Jacoby, not to mention the illustrious living, have all been advocates of alcohol at its proper time and amount. Not being a practising physician, I am more than satisfied to take their word on this subject. I believe this is a proper time for me to express my horror at the situation which has arisen in the practice of medicine by prohibition. It is the sacred duty of every upstanding and straightforward thinking practitioner and physician to voice his opinion on a public health matter of such vast importance to the community. To be brief, it needs no argument to convince anyone that alcohol is necessary in the treatment of diabetes in some of its stages. Congress has decreed that the physician can only give a patient a pint every ten days—a ridiculously small dose for any well or sick being. The whiskey prescribed is supposed to be sugar-free. Is it? It is common

knowledge that the whiskey obtained on physicians' prescriptions at drug stores and other places is not only not always sugar-free but contains poisons or deleterious substances such as diethylphthalate, that the whiskey is a fresh product, that it has been cut or, to use a common expression, monkeyed with. Congress, having insulted the medical profession by restricting its proper jurisdiction in matters wholly medical, has at the same time wrapped about its shoulders a cloak of virtuosity, hoping thus to conceal crass ignorance of a strictly scientific and medical problem, and has Volstedded us into a dilemma leaving us no remedy to counteract this drastic measure.

I have prepared a table (No. 1) which I will not read, showing the number of positive tests for alcohol in different classes of cases for the year 1927. This table, of course, does not represent the number of cases in which alcohol is a contributory cause of death. In the final classifications made in the office, cases dying as a result of automobile accidents or other forms of traumatism are classified according to the nature of the traumatism, no attention being paid to history of alcohol. No case is examined for alcohol which has been longer in the hospital than twenty-four hours because the oxidation of the alcohol is complete by that time. Further, there are numerous cases of deaths due to illuminating gas poisoning, to falls, etc., which are signed out without an autopsy and no attempt is made to determine the presence or absence of alcohol chemically. In a paper upon Carbon Monoxide Poisoning, we determined that alcohol played a very considerable rôle in accidental gas asphyxiations. In one year (1923) intoxication was a known contributory factor in 69 deaths by illuminating gas in Manhattan out of a total of 261 in that Borough.

TABLE NO. 1
1927—ALL BOROUGHs

Automobile accidents	65
Trolley car accidents	4
Subway accidents	11
"L" train accidents	8
Homicides by shooting	37
Suicides by shooting	5
Homicide by strangulation	1
Homicides by stabbing	22
Homicides by assault	17
Straight ethyl alcohols	114
Straight wood alcohols	33
Fall from buildings	5
Fall down elevator shafts or stairs	31
Fracture of skull and street falls	49
Found dead in areaway	1
Found dead in bed, room, hallways, home	102
Suicides by other means (poisons)	24
Gas cases (suicidal and accidental)	5
Shot by policeman	10
Died while at work	1
Industrial accidents	1
Died in prisons	2
Drownings	2
Foreign body in larynx	14
Cerebral hemorrhages	1
Fracture of spinal column	12
Fall from merry-go-round	6
Found dead in tank	1
Fell through window	1

HIGHWAY ACCIDENTS FOR THE YEAR 1927
IN BOROUGH OF MANHATTAN

	No. alcoholic (as determined by chemical examination or history)
Automobiles	44
Auto trucks	23
Street cars	8
"L" and Subway trains	14
Railroad train	1
Horse drawn vehicles	2
Collisions	4
	—
Total	96

In the year 1927 there were 592 highway accidents in Manhattan, of which number 431 were adults 18 years of age and over.

Through the kindness of Dr. William H. Davis, Chief Statistician for Vital Statistics of the Department of Commerce, Bureau of the Census, at Washington, I have obtained the figures in the registration area in Continental United States, which are as follows:

TABLE No. 2

DEATHS FROM ALCOHOLISM AND CIRRHOSIS OF THE LIVER

(Figures obtained from the Bureau of the Census, Washington, D. C.)

THE REGISTRATION AREA IN CONTINENTAL UNITED STATES

Calendar Year	Number of deaths from—			Death rate per 100,000 estimated population from—			Percent. of total popula- tion of conti- nental U. S.		
	Alcoholism (acute or chronic)	Cirrhosis of the Liver		Alcoholism (acute or chronic)	Cirrhosis of the Liver				
		Total	Specified as alcoholic		Not specified as alcoholic	Total		Specified as alcoholic	Not specified as alcoholic
1926	4109	7591	452	7139	3.9	7.2	0.4	6.8	89.8
1925	3694	7519	480	7039	3.6	7.3	0.5	6.9	89.4
1924	3153	7344	419	6925	3.2	7.4	0.4	7.0	88.5
1923	3148	7027	339	6688	3.2	7.2	0.3	6.9	87.6
1922	2167	6977	218	6759	2.6	7.5	0.2	7.2	85.3
1921	1611	6598	158	6440	1.8	7.4	0.2	7.3	82.2
1920	900	6241	—	—	1.0	7.1	—	—	82.2
1919	1367	6704	—	—	1.6	7.9	—	—	81.1
1918	2220	7817	—	—	2.7	9.6	—	—	78.5
1917	3922	8569	—	—	5.2	11.4	—	—	73.4
1916	4161	8799	—	—	5.8	12.3	—	—	70.8
1915	2915	8439	—	—	4.4	12.6	—	—	67.5
1914	3257	8526	—	—	4.9	13.0	—	—	67.2
1913	3744	8197	—	—	5.9	13.4	—	—	65.5
1912	3183	8176	—	—	5.3	13.5	—	—	63.5
1911	2875	8310	—	—	4.9	14.0	—	—	63.2
1910	2909	7485	—	—	5.4	13.9	—	—	58.3

Note: Prior to 1921 the deaths from cirrhosis of the liver were not separately tabulated for those specified as alcoholic.

I have also obtained figures from the Record Room of Bellevue Hospital, showing the number of discharges and deaths in the four hospitals of the Department of Bellevue and Allied Hospitals for a period of twelve years, from 1914 to 1926 inclusive. The table follows:

CIRRHOSIS OF THE LIVER												
(1) Discharges (2) Deaths												
Bellevue		Gouverneur		Harlem		Fordham		Total				
(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	
1916	109	41	8	6	47	13	20	5	184	65		
1917	108	32	5	1	11	8	17	2	141	43		
1918	124	52	7	5	23	4	12	2	166	63		
1919	98	4	6	1	31	13	4	1	139	19		
1920	72	20	6	3	No report		6	2	84	24		War
1921	80	23	0	0	No report		1	1	81	24		
1922	63	16	3	0	6	2	0	0	72	18		
1923	76	15	2	1	4	3	2	1	84	20		
1924	55	20	3	3	6	2	6	3	70	28		
1925	60	10	3	0	7	1	11	2	81	13		
1926	62	24	5	4	6	3	6	4	79	35		
	61	16	4	0	9	0	8	1	82	17		
	95	29	7	1	5	5	5	3	112	38		

The figures which I have briefly presented will show you that prohibition has not decreased the death rate from alcohol nor has it apparently decreased the number of cases of cirrhosis of the liver. From dry sources we learn, and from others who should know better, that it is only the volume of alcohol which accounts for the increased number of deaths from alcohol. Anyone familiar as I am with the exhibits in the morgue will realize that it is not only the volume but also the quality of the alcohol which is drunk which is of importance. In the Medical Examiner's Office, alcohol has been a cause of sudden death in a very large number of cases. Although I am unable to prove an increase, on account of the inefficient work of the Office of which the Medical Examiner is the successor, a long and intimate association with the Bellevue morgue warrants the statement that since prohibition, what is called sudden death from alcohol has increased notoriously. I believe that this is mostly due to the quality of the alcohol consumed. It cannot be denied that volume is a most important factor. No matter what the chemists may say, fresh distilled spirits, not aged in the wood, having a vile taste and odor, its sources being private or home or bootleg stills, and also denatured alcohol obtained by illicit means from Government warehouses and from plants using alcohol for commercial purposes, are responsible for the marked toxic action of the stuff which is drunk. I must leave it to Dr. Gettler to tell in his graphic way the sources of the increased toxic action of bad liquor.

There is every reason to believe that the original motives of the Anti-Saloon League were praiseworthy. The saloon was undoubtedly a grave menace to society before prohibition. However, the abolishment of the saloon was a mistake. The evils of the saloon could readily have been eliminated by judicial police action. It must be remembered that the saloon was the home of large numbers of our poor population. Many had no other place to go to for comfort and social relief. It was a pleasant meeting ground, especially among the German population. Many

saloons were pleasant places to spend an evening in, especially if one indulged in pinochle or other perfectly innocent forms of amusement. It is undoubtedly sad to realize that we possibly will never again see the charmingly decoratively wicker swinging door in the good old summer time—something entirely American and seen nowhere else. Saloons well regulated, openly free and above board, subject to police inspection and supervision, with the saloon-keeper bonded and subject to forfeiture of his bond in case of any disturbance, and strictly licensed and watched, as in the case of England, are infinitely preferable to what has taken its place, namely, speakeasies. Speakeasies spring up like mushrooms in a field over night. They are not subject to rapid police control, although it must be admitted that everybody, including the police, are aware of their location within a short time of their opening. Being without the law, with closed doors, open only to their patrons, they are subject to no police supervision. It is undoubtedly true that the speakeasies pay graft. They sell a product which is of poor quality. Except in the best places, their wares are from denatured sources. It is quite true that in some of the finer places, there are two separate kinds of alcohol sold; one good, to their special customers and at a high price, and the other denatured stuff at a low price. This arrangement seems to satisfy the goody-goodies and others, who, ostrich-like, for unknown reasons, refuse to remove their heads from the sand.

Let us turn our attention to the effects of alcohol as I have seen it upon the human body. I may state that probably I have seen more autopsies upon alcoholics than any person outside of my staff. Let me briefly summarize this experience.

One hundred and thirty-eight cases of acute and chronic alcoholism were autopsied during the year 1926 in the Borough of Manhattan. Of this number 30 were females. In four cases there was a cirrhosis of the liver; one of these was a fatty cirrhosis and another a marked hobnail; all were in males. In 68 cases there were negative findings as

to the liver, meaning by this, no fatty infiltration or cirrhosis, indicating that in about half the cases there were no lesions which were attributable to alcohol. In 32 cases the livers were very fatty and in 34 cases slightly fatty. In 102 of these cases alcohol was determined chemically, in the majority of the cases three or four plus. You will see, therefore, that in the class of cases which we have designated as acute alcoholism, namely, those subjects who die not as a result of traumatism or violence, etc., but whose cause of death is acute alcoholism, it is a striking fact that we have encountered very few cases of pronounced cirrhosis of the liver, hobnail liver. Much to my surprise, on looking over the reports of the office for one year, 1926, there are very few cases of marked fatty infiltration of the liver, which I have been brought up to believe by my German and American teachers is almost an invariable accompaniment of chronic alcoholism. Curiously enough, the fatty infiltrations, the so-called butter livers, in the straight alcohol cases are much more frequent in women than in men. I can give no reason for this disproportionate ratio. It is somewhat in contrast to the reports that cirrhosis of the liver is more frequent in men than in women, a fact which our statistics bear out.

According to Kaufman, alcohol certainly plays an important predisposing role in the causation of so-called glandular atrophy of the liver. He states that this importance has been somewhat exaggerated and that statistics show that about three-quarters of the cases of liver cirrhosis are due to chronic alcoholism, but he points out that only in a small portion of the alcoholics is a cirrhosis of the liver found. That mostly there is found a fatty liver or no change, and that cirrhosis may establish itself upon a fatty liver (Kern), and that thus the fatty cirrhoses are accounted for. In regard to the opinion held as to the cause of cirrhosis of the liver in alcoholics, it is divided as to whether alcohol has a direct action upon the liver or an indirect action by giving rise to gastro-intestinal disturbances.

Let us briefly review the experimental evidence in regard to the action of alcohol upon a living animal. Since a discussion by Dr. Welch upon a paper which appears in the Johns Hopkins Bulletin, July and August 1904, little may be said to have been done upon this subject with the exception of the classical experiments of Stockard. Please pardon my quotation *in extenso* of Dr. Welch's discussion:

"Dr. Alexander Lambert is to be congratulated upon the valuable use which he has made of the unequalled opportunities for the study of alcoholism in Bellevue Hospital. He has referred to the attempts which have been made to approach this subject from the experimental side. Probably the most extensive and prolonged series of experiments upon the pathological effects of alcohol are those which were conducted here in Baltimore by Dr. Friedenwald in behalf of the Committee of Fifty, the main results of which have been published in the two volumes of the report of the physiological sub-committee. Like most other experimentors we were unable to produce experimentally the most characteristic, although not the most common, of the morbid lesions of alcoholism, namely, cirrhosis of the liver. This negative result cannot be attributed to the short duration of the experiments or to the small quantities of alcohol consumed. It speaks in favor of the view that alcohol acts indirectly in the causation of cirrhosis, the lesion of the liver not being referable to the immediate and direct toxic action of this agent upon this organ.

"Dr. Friedenwald noted extraordinary individual variations in the susceptibility to alcohol on the part of rabbits. Whereas certain animals succumbed quickly to repeated daily intoxicating doses of alcohol, others could be kept alive for at least four years under these circumstances without presenting serious anatomical changes.

"The most common lesion which was produced experimentally was a fatty metamorphosis of the cells of the liver, the heart muscles and the kidneys. This lesion quickly disappeared after stopping the alcohol. I am not

inclined to attach as much clinical importance to the occurrence of fatty degeneration of the cardiac muscle as Dr. Lambert seems to do. This condition cannot be brought into definite relation with the symptoms which it was formerly customary to assign to it. Several years ago, in my studies of the general pathology of fever, I demonstrated that high degrees of fatty degeneration of the heart muscle could be produced experimentally in rabbits without apparent serious impairment of the force and functional activity of the heart. Of course there may occur such extreme degrees of fatty degeneration of the heart muscle that it may be supposed that the function of the muscle is seriously injured, but these are relatively infrequent cases. It is now known that most of the symptoms which were formerly attributed to fatty degeneration of the heart are the result of disease of the coronary arteries or of some form of myocarditis, and we also know that a very painstaking examination may be required to reveal some of the significant myocardial lesions. We must, however, admit that there may occur serious functional disturbances of the force and action of the cardiac muscles without definite pathological changes of the heart which we can demonstrate. In these cases there may or may not be fatty degeneration of the muscle, and, as is well known, this degeneration often enough occurs without any symptoms referable to the heart. Of course, fatty overgrowth is a quite different condition from so-called fatty degeneration of the heart, and may be a serious affection in alcoholics, especially in beer drinkers.

“Inasmuch as the special poisonous action of alcohol is primarily upon the higher nervous centers, the morbid changes of the nervous system in alcoholism are of special interest. We should distinguish between those pathological lesions of the brain, such as thickening, opacity and adhesions of the membranes, chronic pachymeningitis, edema of the brain and meninges, granular ependymitis, atheromatous arteries, etc., which are common in chronic alcoholism, but which are not responsible for the destructive cerebral symptoms of alcoholic intoxication, and those

more delicate changes of the nerve cells and their processes, revealed by the Golgi Marchi and other refined methods. These latter changes can be produced experimentally, as was shown in Friedenwald's experiments, but, as is well known, it is very difficult at present to utilize these findings in explaining the alcoholic psychosis. One of the most interesting outcomes of recent investigations has been to correlate the various distinctive alcoholic diseases of the brain, spinal cord and the peripheral nerves on the basis of the neurone doctrine, the underlying condition being a toxemia induced by alcoholic excess and manifested now in one part of the neurone system and now in another part; it may be in the form of peripheral neuritis, or of delirium tremens, or of Korsakow's psychosis, or of acute hallucinatory mania, or of alcoholic epilepsy."

For the purposes of this address it is unnecessary to review the numerous attempts to produce cirrhosis of the liver in animals by ingestion of alcohol. The lesions commonly associated with alcoholism have not been reproduced in animals. The literature bearing upon this subject may be found in any of the large German textbooks of pathology. It is not necessary to discuss even briefly Stockard's experiments. I was very much struck with the screen which he showed at one of the Medical Society's meetings in this hall. An old buck guinea-pig, fed on alcohol for four years in daily doses, was certainly a fine specimen with a wicked leery glance to his eye. Experiments on animals by Stockard seemed to indicate perfect harmony with those that have been recently compiled as to the effects of alcohol upon procreation; that it may induce abortions and early deaths is evidently correct, but many of those that survive infancy become strong healthy adults. I find that these facts are in perfect accord with human experiments and knowledge, derived not only from sources of our own generation but those of many previous generations. Even a casual consideration of alcohol leads me to believe that if its ingestion had been so injurious as the picture has been painted few probably would be alive at this time, especially those of the white races.

I have hesitated for the reasons given to describe before this audience the abuses of alcohol. Modern opinion is inclined to the belief that the weak and neuropathic individuals of our race are susceptible in a very high degree to the injurious or toxic influences of alcohol even in small doses, and the belief that alcohol is the cause of mental disturbances is largely incorrect. The constitutional inferior is extraordinarily susceptible to alcohol. Too much stress has been laid upon alcohol as a cause of these disturbances. It is not the primary cause of many of the mental diseases to which the human race is heir. Tuberculosis, syphilis, poor sanitation, unsanitary, ill-ventilated and sunless dwellings are a much more potent source of disease than any other factor. Is it strange that people living in many of the congested sections of New York City should have recourse to alcohol? It would lead me too far astray to enter into this subject at length. Poor living conditions only recently have been brought up for consideration in our civic life—largely through the efforts of our able Mayor, and at last a desire is apparent to alter the living conditions of the poor, to give them respectable homes. In cutting out the saloon we have deprived them of their places of amusement and of their liquid bread—the beer of the Germans and the pain liquide of the French—which has such marked nutritive and tonic properties. I believe that less attention to alcohol and more attention to the physical and psychical welfare of the poor would be far better than this one-sided action by probably well-meaning people to abolish the innocent pleasures of a people. It is undoubtedly true that statistically speaking, industrial plants, especially in the early years of prohibition, were greatly benefited by prohibition. I have seen no recent statistics, however, on this subject. Those that I have seen are derived from the earlier years, 1922 to 1924 inclusive. It is well known that in Pennsylvania the miners get their beer, because the owners realize that if the Slavs and Hungarians did not get it there would be a strike, and so they are supplied with beer. Personally, I cannot vouch for this statement but there are a good many

other things in life that one cannot personally verify without a considerable expenditure of time and money.

I would like to see in my own country the same attitude towards life that I have seen in Austria and Germany, especially in Bavaria and the Rhineland, where the people enjoy themselves in the garden or in an innocent inn, partaking of one or two glasses of beer, having an intelligent conversation amongst themselves and listening to good music. No matter what the industrialists say, the human body can never be considered in the light of, let us say, an automobile—that it can run willy or nilly. Even an automobile must be given a chance to rest and have its parts fixed before it is sent on another long run. I do not like the attitude which many of the industrialists have taken, lauding the virtues of prohibition at what I consider the expense of the human body. The human body is the most complex mechanism that one can imagine; its intricacies are being delved into and elucidated day by day and necessarily slowly. No human machine can run efficiently unless it has mental relaxation.

It is interesting to trace the connections and character of the people that are so violently anti-alcoholic. The majority of them are sect people. They are interested in anti-vivisection, anti-tobacco, anti-evolution, restriction of amusements, especially on Sundays. They are all antis except when it comes to prohibition.

Has prohibition been worth while? All law-abiding citizens of whatever class are unanimous that moderation in all things is desirable. The statistics clearly indicate that the Eighteenth Amendment and the Volstead Act have not brought about salutary results. Instead of saloons we have speakeasies. There is little doubt that there are many more speakeasies than there were old-fashioned saloons. The saloons remaining are run as restaurants and in them those known may obtain alcoholic beverages. We read in the papers statements by the drys that it is pleasant to contemplate that the corner saloons have been replaced by flower stores and groceries. The authors of such remarks

cannot be familiar with the actual conditions in a large city. Nobody knows how many flower stores and groceries have back rooms. Prohibition has made those who still want to drink spirits or wine, potential manufacturers. Farmers are not interested in the urban situation; their apples ferment slowly; they mostly vote dry and drink wet.

Are there any facts to substantiate the statements made? They are readily obtainable from many independent sources. For instance, information obtained from the Hospital Information Service Bureau of the United Hospital Fund shows that prohibition has not stopped the ambulance calls for cases of delirium tremens, 472 cases in New York City last year being removed to hospitals and 8,102 cases of acute alcoholism which were attended to. This does not include the ambulance calls classified otherwise, namely, those suffering from falls or other traumatism, gas poisoning, etc., as the result of alcoholism.

Without question the rum death tide rises in a dry era. As I have shown, there is an increase in the death rate from alcohol in the registration area of Continental United States, both in the dry and the wet states.

National prohibition was effective as of midnight January 15, 1920. It has cost the nation since that time nearly 178 million dollars. The Government has lost in national taxes on alcohol approximately a billion dollars a year. A business corporation would ask itself: How comes this to pass? Why this loss to us? Is prohibition an example of ideology run rampant? Every reasonable man would be willing to sacrifice himself in a policy of idealism if it brought commensurate results, but a business man must be shown why he should sustain this loss unnecessarily.

Prohibition has increased drinking not only as to volume, but, as I have attempted to show, has increased the risks attendant upon the drinking of impure alcohol. As quoted above, "*salus populi suprema lex*" is a subject that no nation can afford to disregard. The people in the end must be shown why.

Prohibition as a measure to further the welfare of the people is no recent matter. A number of foreign authors have dealt with prohibition in a sensible manner. I may quote from one of the extreme French opponents of the promiscuous use of alcohol, Dr. E. Monin, author of "*L'Alcoholisme*," a medico-social study, published in Paris in 1917. The striking statement is made that abstinence is an ideal but one should not demand anything but temperance. This is the formula of a reasonable hygienist. Temperance alone can create a superior and anti-alcoholic class. Only in this way can one conciliate the divergent opinions on alcohol. To attack wine, to declare that everything which contains alcohol is not fitted to be a hygienic beverage, there lies the error, there lies the fanaticism. Everything is a question of moderation. If wine is a product of God, drunkenness is that of the devil. Let us be sober but with sobriety, says Jean-Jacques.

Dr. Monin is the best qualified prohibitionist and moderator that I know. His statements are sane and although somewhat biased, he nowhere prohibits the use of alcohol as a medicine in the form of good wines, etc.

To conclude, a careful consideration of the subject of alcoholism may be said to startle us with the lack of accurate information that we have concerning morbidity and mortality. The statistics presented, drawn from various sources, as to the number of arrests in the pre-prohibition era as compared with the present era, except those of the Moderation League, are mostly laughable. The statistics are unreliable because they are made up by people who have no knowledge of actual police or civic problems. No arrests are made of people found staggering in the streets if they are apparently able to get home without assistance. An extra duty upon the police at best, if they were arrested where could they be taken for the night?

The consumption of impure alcohol with all its deleterious effects is at this time an actual public health menace.

Drinking during prohibition has become a secret vice, with all the terrible consequences which ensue from such an evil. Prohibition, as an amendment to the Constitution and its Volstead Act—what beneficial action has it conferred? An economic issue of unparalleled extent has been created. A bureau of enforcement with a constantly increasing budget has been established. A new incentive to crime has been nurtured followed by an increased number of homicides by enforcement officers as well as bootleggers and hi-jackers. It has brought property and real estate changes of enormous value. Breweries and distilleries with large property and financial interests have been dispossessed. Our mode of living and habits have been changed. We have been transformed into a people eating in cafeterias with bad food at high prices. Demoralization of the spirit of the youth of our country is prevalent. What happens to us elders is of little consequence.

In a lawless country the argument that law enforcement is supreme is subject to doubt. Prohibition enthusiasts forget that the drinking of a glass of beer is not under any circumstances *mala in se* but *mala prohibita*. Our grandfathers threw the tea into the waters of Boston Harbor. *Qui bono?*

Let me say finally, until all our citizens take a pledge, there is only one remedy and that is absolute and strict enforcement by federal, state and municipal authorities. To function perfectly, the enforcement of the Eighteenth Amendment must prohibit importation, compel the closure of all commercial and private stills and home brews, the elimination of bootlegging, the establishment of a corps of strictly honest prohibition officials, if any such can be recruited in the United States. The reverse of the medallion is that the customs, habits, morals and the religious observances of millions of people are to be altered by some miraculous psychologic transformation, which I have seen, heard or know nothing of. Appeal to common sense and unity of ideals and standards seems to be the only effective remedy. In a democratic community, after

all, is the determining factor, the solution of a grave public health menace.

Dr. Louis I. Dublin, in an article read at the Forum Session of the American Public Health Association on October 20, 1927, published in full in the American Journal of Public Health and The Nation's Health, January issue of this year, has contributed a very illuminating article upon prohibition and its relation to public health. He has analyzed the figures furnished by the Metropolitan Insurance Company. To quote him very briefly, he states: "That the prohibition period is characterized by sharply declining mortality rates among children and adolescents of both sexes; and that this decline is characteristic of a number of additional age periods among women. The improvement is retarded among young male adults and disappears altogether during the middle years of life in that sex. In fact, the mortality has definitely risen among men after age 35. Altogether we may safely say that over half of the total population has experienced a very favorable mortality during recent years. One might even go a bit further and say that the facts are consistent with an assumption that the conditions of life during the period of the new legislation have been beneficial to this large part of the public. A little arithmetic will show that there has been a saving each year of about 14,500 children under age 5, another 2,000 each year between ages 5 and 10 and another 1,000 between age 10 and 20. This makes a total of approximately 17,500 young lives a year.

"At the children's ages, the greatest improvement in the death rate has taken place from accidents, from diarrheal diseases and from pneumonia. Infectious diseases have likewise declined considerably. Among young women, the improvement we spoke of is traceable somewhat to a decline in tuberculosis. There has also been a sharp decrease in the mortality from puerperal causes. It would appear, therefore, that the improvement is a response, in some measure, to the direct attack made by health and social service agencies both public and private which has been

going on for years against the communicable diseases and against the diarrheal diseases of children. But, in addition, it may be considered a reaction to a rising standard of living, and this is especially evidenced by the lower tuberculosis and the lower pneumonia rates.

"The whole picture is consistent with and may well be expected to have arisen (to an appreciable degree) from better conditions within the home, such as more and better food, better medical service and better housing. It is impossible to measure or to say how far any one factor has operated in the direction of reducing mortality. The increased facilities of public health work and the better conditions within the home have operated together to produce the end result, and it would be entirely unfair to over-emphasize the effect of one of these forces as against the other. In fact, these two activities work best hand in hand and add to each other's effectiveness.

"While we may say that the death rate of children and of young women, that is, those who remain at home for the most part, would probably have gone down without prohibition, it would be too much to assume that the conditions within the home during the prohibition years had not been instrumental in furthering the decline. The conditions of domestic life during the last few years have been such as to add incentive and power to the forces already at work to make for better health and longer life in these divisions of the population."

Dr. Dublin emphasized the improvement in economic conditions and is not willing to accept without qualification the suggestion that "that part of the wages which under the old regime went into the liquor traffic is now largely diverted into channels which mean increased protection and welfare for the family." He states that "this phase of the subject is unfortunately beclouded with much uncertainty," and that "we know very little that is accurate with reference to the amount of alcohol now being consumed, what is being spent for it, and least of all, how

the facts shape up for the various economic levels of the population."

In a heading entitled "Rise in Male Deaths due to Alcoholism," he says: "How then does our assumption with regard to women and children tie up for the facts we have given for the condition among men? Why have the death rates for men increased in view of these favorable changes? In that sex, we find that an improvement in tuberculosis has gone hand in hand with an increase in the mortality from pneumonia, from accidents, from heart disease and kidney disease. During this period, there has been a constant rise in the death rate from alcoholism and from the associated condition of cirrhosis of the liver. Both of these diseases were at a minimum in 1920. They are now at a point almost as high as in the decade prior to prohibition. The picture we have found to exist in the mortality of adult men in the United States is entirely consistent with the observations universally confirmed of a continued widespread indulgence in alcoholic beverages by men. Prohibition has not been particularly effective in that sex and especially has this been true in the cities, and, more particularly, in the eastern states.

"If the saloon has gone and the great body of men no longer spend a great part of their wages on liquor, it is only too clear that what they do drink now, even if in smaller quantities and at a lesser total cost, is of such a deleterious character, as to result in no advantage to their health. The quality of liquor used throughout the country is sufficiently bad to make up for the smaller quantity consumed. The economic gains help us to understand the condition among women and children; the character of the present supply of liquor helps us to understand the lack of improvement which appears in the mortality of men.

"There can be little question as to the unsatisfactory situation now confronting large areas of the country as regards the use of alcohol by men. Beginning with 1920, there has been a continuous and marked rise in the number of deaths resulting from the use of alcohol. In 1920,

the death rate from this condition reached its minimum, namely, 1.3 per 100,000. Every year since then, virtually with no exception, has seen a rise and the rate is now more than three times as high as it was only six years ago.

"The same condition is found to exist among the industrial classes as among those of larger incomes whose insurances are carried in the ordinary departments of the insurance companies. The insurance results are confirmed by the population figures for the several states and this phenomenon is widely observed, larger cities showing more strikingly what can be found in the smaller ones with a little more searching. In Maryland, the alcoholism death rate in 1926 was the highest ever recorded since 1911. In Rhode Island, Michigan and New York, the 1926 rate was the highest with a few exceptions.

"The records of hospitals for the insane tell a similar story. The year 1920 showed the lowest rate for admissions to hospitals for mental disease due to alcoholism. Since that year, the admission rate has increased step by step and last year saw conditions three times as bad as six years ago. It is only too true that in the country over, with very few exceptions, there is a mounting rate from alcoholism and from the associated diseases among the male population.

"This situation is in striking contrast with what has occurred in neighboring Canada. In the Dominion, likewise, several provinces have been experimenting with one form or another of regulatory legislation. But in that country, there is as yet no evidence of any untoward result in the mortality rates for any large group of the population. The experience of the Metropolitan Life Insurance Company in Canada is especially instructive. Among over 1,000,000 policy holders, there have been recorded only 100 deaths from alcoholism and acute alcoholic poisoning during the entire period, 1911 to 1926. On the annual basis, the number of deaths from these causes among Canadian policy holders is so small as to be almost negligible. The death rate from these causes, in fact, is only about a quarter of

what it has been among insured lives in the United States. But what is even more interesting is the fact that the deaths from alcoholism have gone down during the last ten years in Canada—a condition very different from that in the United States. In so far as death rates are a reliable indication, the Canadians seem to have succeeded much better than we in their efforts to control the problem of alcohol and of alcoholism.”

I know that you will pardon my quoting *in extenso* from Dr. Dublin's article. Dr. Dublin is certainly against the drinking of the highly deleterious stuff that passes for alcoholic beverages these days.

Professor Raymond Pearl of the Johns Hopkins University, Department of Biology, has analyzed the age of the deaths in Johns Hopkins Hospital of over 2,200 persons. In order to show the effect of alcohol on the age in which these persons have died, he has classified them into three groups—the abstainers, the moderate drinkers and the heavy drinkers. His statistics show that the moderate drinkers outlive slightly the group of abstainers, 45.10 to 45.2. The statistics from the alcoholic wards of Bellevue Hospital show that there has been no decrease from deaths due to alcohol since the constitutional prohibition was enforced, namely, at midnight on January 15, 1920, a little over eight years ago.

II.

A STUDY OF THE ALCOHOLIC CONTENT OF AUTOPSY MATERIAL, AND ITS BEARING ON THE CAUSE OF DEATH

ALEXANDER O. GETTLER

Before taking up the question of alcohol, will you pardon me if I diverge a little and take a few minutes in talking about the chemical and toxicological department of the Chief Medical Examiners' Office. Very few people in New York City know that such a department exists; in fact

there are many people in New York who do not even know that a Chief Medical Examiner's office exists. It was only because of supreme effort on the part of Dr. Norris, that New York City consented to have the toxicological laboratory installed. My main reason for talking about this department is because of statements made that so little research work has been published and the material at hand is so large. I will give you a short summary of the work of the Department of Toxicology.

The laboratory is situated at Bellevue Hospital on 29th Street and First Avenue. It takes care of all the chemical and toxicological work of the Medical Examiner's Office from the five boroughs, Manhattan, Brooklyn, Bronx, Queens, Richmond. In this laboratory there are analyzed annually approximately 1500 cadavers. Each cadaver may necessitate the analysis of several organs—the liver, brain, spleen, kidneys, etc. The analysis of one cadaver may sometimes take several days. There are of course, some analyses like alcohol which are completed in a couple of hours. Besides these analyses of cadavers, the Chemical Department does work at the request of the Police Department such as examining blood stains, medicines, liquors, hair, weighing bullets, and other odds and ends. Then I am also called to District Attorney's Offices in all of the five boroughs as a consultant. The District Attorney does not come to my laboratory but I have to go to each respective borough. All this is very time consuming.

I am also called to testify before Grand Jury, Court, or compensation referee. The court work is the least thankful of all. The work is done as scientifically as possible. The results are interpreted in an honest way. At the time of the analysis I do not know whether the defending lawyer or the District Attorney is going to ask me to appear. Results of analyses are filed with the Chief Examiner as soon as completed, and long before the matter goes to court. When the case comes up I am subpoenaed to testify. The opposing lawyer then tries to "show you up" by asking all kinds of tricky questions. I will give you one very short instance.

This was a case of an automobile accident, with ensuing death. I testified that the man was intoxicated at the time of death because of the amount of grain alcohol I found in his brain. The lawyer for the defense then got up and cross-examined me. He picked up a book from his table, opened it, looked at me, and asked, "Do you know Single?"

I looked at him, I did not know what he meant. I thought he had a book written by a man named "Single." So I said, "No, I have never heard of him."

He looked at me and smiled at the jury. He asked me again, "You do not know what Single is?"

Then it occurred to me what he meant. There is present in the brain tissue a substance called Sphingol. This happens to be a chemical substance, a solid which has hydroxyl groups and is chemically classified as one of the substances belonging to the large group known as alcohols. So I said to him, "I think I know what you mean. You mean Sphingol."

He said, "Yes, what is it?"

I said, "It is an alcohol."

"Oh well then, everybody has alcohol in his brain has he not?"

I said, "No. Not grain alcohol."

He looked at the jury and smiled, and said, "That's all." The District Attorney should have cleared up this point. I suppose he did not know enough chemically to do it. Such are the things we are "up against."

You can all see by this short review that the work of the Chemical Department is quite lengthy. Now what is the staff which does this work? We have in the Chemical Department three individuals—myself and two assistants. The total outlay in salaries is \$4700 and dividing that by fifteen hundred cadavers it means that an analysis of a cadaver cost New York City just three dollars. The Police Department work, the District Attorney Office work, the court work is thrown in gratis.

If a person knows the conditions above referred to, I do not think he will ask, "Why has not the Department done more research work, having such wonderful material?" We have wonderful material but we have not got the time. Our time is taken up too much by routine work, and even so we have been able thus far to work up chemically and publish about twenty-four papers on different subjects. One of these papers is on alcohol and is the one I will bring to your attention to-night before I talk about these samples of liquor which have killed people.

The work which I want to talk about first, is a method by which we can tell by analyzing the brain whether a man or woman was intoxicated at the time of death. Intoxication, of course, may be contributory to automobile accidents, to vocational accidents, etc. One important question that has always been put to me when in court or before the compensation referee, was this man intoxicated? That question could never be answered definitely because, first, we did not have methods that were tried out well enough so that we were sure they were accurate methods for determining alcohol in tissues; and secondly, we did not know whether the alcoholic content of organs was any index to intoxication. These two points we have solved.

First one must bear in mind that this method must detect and quantitatively determine extremely small amounts of alcohol. Amounts as small as four drops of alcohol in the entire brain (0.01%). Then this small amount of alcohol is intermixed with a large amount of body tissue.

We first tried out various methods found in the literature but had to discard one after the other. I will simply run over them quickly. We tried first the method of Nicloux, titrating the alcohol in the brain distillate by a dichromate sulphuric acid mixture. This did not work because there are other volatile substances in the brain tissue which react with chromic sulphuric acid. We tried oxidizing to aldehyde and determining with Fehling's solution. We tried the methods which are based upon the reduction of potassium bichromate by alcohol.

compounds (ethyl iodid). We found these methods useless for small traces of alcohol.

We tried to determine it by specific gravity or by refractive index. These also had to be discarded. The methods which seemed to give us best results were those in which the alcohol was oxidized to acetic acid and then the acetic acid titrated with very weak standard alkali solutions and upon this principle we finally developed a method that is quantitative.

At first when this method was tried, we obtained very inconsistent results. Amounts of reagents to be used, and optimum conditions for the best recovery were finally worked out. Under these conditions we were always able to recover between 83% and 86% of the alcohol added. The average is 84.5%. By multiplying this by 1.18 we obtain the total alcohol present.

It might seem that a difference between 83% and 86% is very large. But when you consider that the total amount of alcohol in a brain is only in the neighborhood of 0.35% the difference between 83% and 86% (error $\pm 1.5\%$) is not much. It simply means that if a brain contains 0.35% alcohol, I will obtain by this method a result somewhere between 0.345% and 0.355%.

The method developed is as follows: Five hundred grams of brain material are ground up. Enough water added to make mixture fluid, acidified with tartaric acid, little white oil added to prevent frothing, and then distilled with steam. Eight hundred c.c. of distillate are collected. To 300 c.c. of this distillate are added 20 grams of potassium dichromate and 40 grams of sulphuric acid. The mixture is distilled at a slow rate until 250 c.c. are obtained. This distillate is titrated either with 1/50 normal or 1/100 normal alkali. From the titration figure the alcoholic content is calculated.

Now as to the question, is alcohol in the tissues an index of intoxication? If we find alcohol, what does it mean? Several points had to be cleared up. First, what organ or

tissue is best for analysis in order to determine intoxication. We have tried brain tissue, liver, lung, kidney, and we found that the brain gives us the best index of intoxication, which of course one would expect. Still it had to be proven as a fact.

The next point, is alcohol normally present in the brain? That is in people who imbibe no alcohol. Is there ever any alcohol present in the brain due to normal metabolic processes? There is a great array of literature on this subject. Among the various workers in this line Ford, Nicloux, Landsberg, Maignon, Pringsheim and Schweisheimer have reported the presence of traces of alcohol in human brains, although the individuals had not consumed any. Most of these workers, however, did not use human brains, they used animal tissue and human blood. They found that the amount of alcohol present ranges from .001% to .083%, very small traces.

Another series of workers trying to determine whether alcohol is present normally or not, not trying quantitative methods, but just qualitatively, such men as Bechamp, Rajewsky, Vitali, Nicloux, Stocklasa, Arnheim, Rosenbaum and Umber came to different conclusions. Some of this group stated that alcohol is present normally; others of this group that alcohol was not present normally. The reason for their opposite conclusion is mainly due to the fact that the tests which they used were not specific for alcohol. They used tests such as Moore's, Schiff's, Nessler's, Lieben's, which are not specific for alcohol. To date therefore it has not been proven whether alcohol is present or not as a normal constituent of brain tissue. In applying our method to human brain tissue (brain of people who had consumed no alcohol) we found that each one reacted slightly positive to our quantitative test. The amount is very small, about 7 mg. in 1000 grams of tissue.

Let me outline the chemistry of this test. Alcohol is C_2H_5O , and when oxidized it is converted into acetic acid. This latter can then be titrated, and from the titration

figure the alcohol calculated. When normal (non-alcoholic) brains are distilled and oxidized, a small amount of acid is also produced. Whether this acidity was produced from ethyl alcohol normally present or some other volatile substances we can not say. We have proven however that if it is alcohol, the amount present normally is always less than 25 mg. per kilo of brain. I might add that 25 milligrams in a kilo of brain means about one half drop of alcohol in the entire brain. This is the limit of the alcoholic content of a person who never takes alcohol, provided it is alcohol, which has not been definitely proven.

I might say at this stage that I am now having under investigation this very point, whether the substance present in brain, volatile and oxidizable to acid is really alcohol.

Now we come to the alcoholic content of the brain of partakers. When this paper was written we had examined over 6,000 human brains of various alcoholic contents. The results obtained were compared with the histories of the cases in question. Of course when it comes to histories, one well knows that some of them must be taken with a grain of salt. We have tried to pick out those cases in which the histories were pretty definite and trustworthy. In many cases hospital records were used.

In the chart, the cases with an asterisk were habitual users of alcohol. The others were occasional drinkers.

Case 6 was one of intoxication, and in the hospital three and a half hours, the alcoholic content .315%. Notice the great increase over the normal. The normal was .0015. There is no question as to the presence of alcohol. The normal value is in the third decimal place.

With the plus signs we designate the alcoholic content for the Police Department and for the layman because the actual figures mean little to them.

CHART I.

RESULTS OF ESTIMATION OF ETHYL ALCOHOL IN BRAIN TISSUE

Case	History	Cause of Death	Gm. of Ethyl Alcohol per Kilogram of Brain	Percentage of Alcohol in Brain	Arbitrary Classification
1	In hospital 12 days; no alcohol given	Heart	0.0062	0.0006	Absent
2	In hospital 18 days; no alcohol given	Mercury poisoning	0.0195	0.0019	Absent
3	In hospital 8 days; no alcohol given	Nephritis	0.0156	0.0015	Absent
4	In hospital 24 days; no alcohol given	Heart	0.0093	0.0009	Absent
5	In hospital 15 days; no alcohol given	Pernicious anemia	0.0116	0.0011	Absent
6*	Intoxicated; in hospital 3½ hours	Alcoholism	3.150	0.315	+++
7	Intoxicated; in hospital 2 hours	Alcoholism	5.780	0.578	++++
8*	Found dead; seen intoxicated ½ hour before	Alcoholism	2.980	0.298	+++
9	In hospital 8 hours; not intoxicated, but aggressive	Alcoholism	1.760	0.176	++
10	In hospital 3 hours; intoxicated	Alcoholism	2.890	0.289	+++
11	In hospital 4 hours; not intoxicated, but aggressive	Shot	2.040	0.204	++
12	Intoxicated; in hospital 2 hours	Fractured skull	3.540	0.354	+++
13	Intoxicated when fracture received; lived 14 hours	Fractured skull	0.550	0.055	+
14	Same as in case 13; lived 18 hours	Fractured skull	0.730	0.073	+
15	In hospital 5 hours; intoxicated	Alcoholism	3.010	0.301	+++
16	Not intoxicated; in hospital 8 hours	Fractured skull	0.110	0.011	Trace
17	Intoxicated; in hospital 5 hours	Fractured skull	3.660	0.366	+++
18*	Intoxicated; in hospital 1 hour	Fractured skull	2.930	0.293	+++
19	In hospital 1½ hours; not intoxicated, but carefree	Fractured skull	2.250	0.225	++
20*	In hospital 3 hours; intoxicated	Alcoholism	5.450	0.545	++++
21	Intoxicated 30 min. before death	Alcoholism	3.800	0.38	+++
22*	Intoxicated 45 min. before death	Hit by train	4.200	0.42	++++
23	Brought to hospital in coma	Alcoholism	2.690	0.269	+++
24*	Was drinking excessively to the end	Alcoholism	5.050	0.505	++++
25*	Intoxicated 25 min. before death	Hit by auto	3.420	0.342	+++
26*	Found dead; intoxicated 2 hours before	Alcoholism	5.250	0.525	++++
27	Not intoxicated	Heart	0.560	0.056	+
28	Not intoxicated	Gunshot	0.090	0.009	Trace
29	Not intoxicated; one drink 4 hours previous	Heart	0.410	0.041	+
30	Intoxicated 2 hours before death	Alcoholism	3.850	0.385	+++
31*	Not intoxicated; in hospital 6½ hours	Alcoholism	0.750	0.075	+
32	Not intoxicated but carefree	Stabbed	1.590	0.159	++

* Indicates habitués, others only occasional drinkers.

Case 7 was not a habitual drunkard but was intoxicated and two hours in the hospital. Case 8 was a habitual drunkard seen one-half hour before death in an intoxicated condition.

Glancing through the list we find that three pluses and four pluses are intoxicated. Among the one and two pluses we have thus far not been able to find one where the history showed us that intoxication was present.

This chart shows our classification of the cases.

CHART II.

CLASSIFICATION OF ALCOHOL CASES

Classification	Gm. of Alcohol per Kilogram of Brain	Percentage of Alcohol in Brain	Physiologic Effect
Trace	0.050 - 0.200	0.005 - 0.02	Normal
+	0.200 - 1.000	0.02 - 0.10	Normal
++	1.000 - 2.500	0.10 - 0.25	Loss of sense of care; aggressive
+++	2.500 - 4.000	0.25 - 0.40	Loss of equilibrium; intoxicated
++++	4.000 - 6.000	0.40 - 0.60	Unbalanced; intoxicated

Now as to affect. With a trace of alcohol the person looks normal, walks around normally and acts normal. Therefore one plus cases look normal. Two plus cases do not look intoxicated. Some have however lost their sense of care. They are a little aggressive—the modern hooch especially makes one aggressive. In the three plus cases there was a loss of equilibrium (intoxication) and the four plus cases were in the same condition only they were almost helpless. They were so badly affected that they could hardly walk. So by the amount of alcohol in the brain we can now say that we have an index for telling whether a person is intoxicated or not.

Against this many people bring forth the same question that is repeatedly asked of me in court, "Well, doctor, isn't it a fact that I can give the same amount of alcohol to two people, and one may become intoxicated and the other not?"

My answer to that is: We are not analyzing what the man gets to drink. We are not analyzing what the man

has in his stomach. We are not analyzing what the man has in his intestines. We are analyzing for the alcoholic content of the brain.

There is a difference between how much alcohol is in the brain, and how much did he drink, or how much is in his stomach. The amount in his stomach does not affect the brain. The alcohol in the intestines does not affect the brain. Once it gets to the brain, it has an effect and that effect is proportionate to the amount present.

There is experimental evidence in the literature on that same point. Rosenfield in 1901, working with animals, came to the conclusion that the reason habitués can stand more alcoholic beverage is because they have a more rapid oxidative power; that is, their organs can oxidize, burn up alcohol quickly and if they do that, then the alcohol does not accumulate in the brain as it does in other people, so it is a question of oxidation.

Reid Hunt in 1907 came to the same conclusion that tolerance is simply a matter of oxidation. If an animal has a high oxidative power toward alcohol he can stand more. If he has a lower one he can not stand as much.

Pringsheim in 1908 came to the same conclusion. He found that habitués burn alcohol in two-thirds the time. Further, he found that habitués burn up alcohol in all of the organs, not only in the liver. In occasional drinkers the alcohol is oxidized mostly in the liver, but in habitués all the organs have attained the property of oxidizing alcohol. He concludes his paper with the thought that tolerance is due only to oxidation.

Schweisheimer in 1912 corroborated Pringsheim's theory that tolerance is due to more rapid oxidation and found no evidence for increased resistance by the cells.

The foremost workers in this field, all come to the same conclusion that habitués can tolerate more because they have a greater oxidative power toward alcohol.

Our work consisted in taking alcoholics with sudden death, and having a definite history, and analyzing the brain. As far as we have gone, our cases seem to show exactly the same things as these men found in animal experimentation. So much for the alcoholic content of brains.

Now a few words on alcohol deaths. Alcohol deaths in New York City seem on the increase. Dr. Norris has outlined to you not only New York City, but the increase in other states. Now the question of course arises, what is the cause? First, more general drinking. I am talking, of course, mainly about New York City because that is the city I am familiar with. There is more general drinking to-day. It is heroic to have the hip pocket flask not only for grown-ups but youths in their teens; boys and girls have drinking parties. There are many more speak-easies to-day than there were saloons. In going around it is surprising to see cigar stores, candy stores, drug stores, grocery stores, all have as a sideline the whiskey trade. In one block near the hospital, as far as I have been able to estimate, there are about fifteen speak-easies and I have not been able to spot them all. Bootlegging, furthermore, is a very profitable vocation. Many are turning to bootlegging now.

The second cause is the kind of material. Of the whiskeys that come to my attention I would say that 95% of them are really unfit to drink. Some are denatured by the various denaturants which the government puts into them. That group of denaturants is very large. I will just name a few of them. I found among the denaturants whether alcohol, fusel oil, formaldehyd, phenol, aniline, benzo-tro-benzine, ether, quinine, nicotine, mercury, Against diethylphthalate.

that is really if the liquors obtained are denatured, some of isn't it a simply freshly distilled mash, that means freshly to two people and distilled whiskeys, raw alcohol; and still other no?" simply mixtures of alcohol and water and sugar

My answer and a little bead oil and whatever else the man gets to say have he chucks in, puts them into a barrel

and shakes up the barrel. I have been told lately by one of my assistants that they even buy old whiskey barrels, and cut up the barrel, and extract the wood of the barrel and mix that extract into their whiskey. That is a resumé of the kind of liquors which are being sold.

I have brought these samples in case some are interested to see them. These samples I gathered from various cases submitted to me. I picked out colorless glass bottles of the same kind. I really do not think I should have done that. I should have brought up the various kinds of bottles as we get them but the reason I brought these is because they are transparent glass and you can see the nature and color of their contents. All these that you see here are either denatured or raw fresh alcohol and most of these have produced death.

Of course some denaturants are more poisonous than others. The most poisonous of all is wood alcohol. After that pyridine and fusel oil. Some of the others are not so very poisonous and one drink will not kill a person but if he keeps on drinking the same denatured material it is bound to have an effect.

As to the poisonous effect of raw alcohol, fresh mash whiskey, which has not aged, I can say very little because I really think very little is known. But what we know is perhaps this: Fresh whiskey even made in the regular old fashioned way but freshly distilled contains besides ethyl alcohol, a large number of other substances in small traces. Among the alcohols it contains propyl alcohol, butyl alcohol, amyl alcohol, glycerine. It also contains traces of acid such as propionic acid, butyric acid, valeric acid, capric, succinic. It also contains aldehydes. The main part of freshly distilled whiskeys is ethyl alcohol. These other substances are present in very small traces.

What effect these above mentioned substances have upon the organism is also not well known. It seems to be a continual irritation on all the cells and tissues.

On aging, these substances combine with each other to form esters. These esters are more pleasing in taste and much less toxic and irritating.

The aging, therefore, does away with the irritating effect, and produces a pleasant flavor. The consensus of opinion seems to be that aging is simply the neutralization of various substances in ordinary fermented material.

I have also brought up here two of the latest denaturants which the Government uses and perhaps some of you would like to see them.

In conclusion, the fatalities due to alcohol I would say are due first to alcohol excess; second, to denatured, poisoned liquor; third, to raw fresh whiskey and this raw fresh whiskey seems also, as I said before, to produce an aggressiveness of the bravado type. It is not so far fetched to say that perhaps many of these hold-up individuals get a lot of their psychical effect from this kind of alcohol. Of course there are other reasons also which do not come into this subject but I think it is not far fetched to say that that is one reason.

The complete prohibiting of alcoholic beverages has also led to a much greater use of drugs.

Beyond this my experience has been such as to agree with the statements in the book which I have read lately by Raymond Pearl of Johns Hopkins, published in 1926, where he has found from a large number of statistics that moderate drinking of bonafide material lowers the mortality and there is a greater expectation of life. Experiments on animals all practically seem to show beneficial effects.

Hence in conclusion I might say it would be far better to make proper use but avoid abuse.

DISCUSSION

HAVEN EMERSON: Dr. Lambert, members of the Academy, ladies and gentlemen: No one need feel discouraged with the progress in city government who has lived through the change from coroner to medical examiner. The lack of pathological knowledge and common honesty, characteristic of the system under elected coroners, has been supplanted by the impersonal and effective use of the sciences of pathology and toxicology for public service and the administration of justice.

Those who have been fortunate enough to stand at the table when Dr. Norris was conducting the autopsy realize his rare capacities in the field of forensic medicine. He is not excelled in this country as a pathologist in public office. It is, therefore, that I accept without question the evidence Dr. Norris has presented from the field of pathology to-night.

His opinions, based upon experience in the fields of vital statistics and sociology, are of much the same value as would be those of statisticians on matters of pathology.

It is a pity that Starling has been quoted only from his emotional post-prohibition writings which in many points reverse the sound physiological opinions he previously held and published. The work by Starling, Mott and Pearl has failed of acceptance physiologically and statistically because of its contradictions and incompleteness of statement. Furthermore the much quoted statements of Pearl on the lower mortality rates of moderate drinkers as compared with abstainers must be considered unsound in view of the scathing destructive analysis of his method and argument by that master statistician, Professor Harold Westergaard of Copenhagen.

First in importance among the scientific discussions of alcohol and public health are those by Dr. John Billings, Chittenden, Bowditch, Atwater and others in this country in 1897-1903, and the report in England in 1918 by a committee including Newman, Cusny, Sherrington and Mott.

The latter group, with the sincerity of men acting for their country at the time of its greatest struggle for survival, came to conclusions which are worth quoting for their brevity as well as for their authority.

"The main action of alcohol apart from the effect of its continued use is confined to the nervous system. Alcohol is a narcotic rather than a stimulant in action. Its habitual use as an aid to work is psychologically unsound. Its nutritional value is strictly limited by its drug and toxic effects.

"The ordinary use of alcohol should not only be moderate, but should also be limited to consumption of beverages of adequate dilution taken at sufficient periods of time to prevent deleterious action to tissue."

If anybody in the face of that extremely restrained statement can claim that the use of alcohol can be accepted as racially or individually advantageous, they have an optimism and imagination which is inconsistent with the facts. Anyone who thinks he can produce the superman of the future may of course be tempted to try for four or five generations so to alcoholize the parents and offspring that there may be a duplicate of those guinea-pigs, vouched for by Stockard, which are larger than the great, great grandparents of the first guinea-pig of the series. As for any attempt by any people to improve themselves racially or individually by the use of alcohol, that is still among the sociological experiments of the future.

The experience of Denmark has been of much importance, as reported by Hindhede, because of the homogeneity of its population, the high level of literacy among the people and their universal and very democratic participation in the determination of their social problems. The interesting fact that comes out of their experience in the last thirty years is that the death rate of men at all ages from twenty up to sixty has fallen so that it almost reaches that of women. In practically all countries there is a discrepancy of from 10 per cent. to 40 per cent. between the death rates of men and the death rates of women

to the disadvantage of men, partly because of occupation and partly because of various other factors including their greater use of alcohol. Wherever beverage alcohol is reduced in amount and practically in proportion to the reduction of its use, there is a closer approximation of the death rate of men to that of women. There is no country in which social practice partly through legislation, partly through economic pressure, but chiefly through very intensive education in the problems of nutrition and of alcohol, has caused such a per capita reduction in the use of alcoholic beverages, by what one might almost call voluntary methods among educated people, as there has been in Denmark in the past twenty years. With this, there has been a nearer approach of the male death rate to the female death rate than has been found in any other country.

We haven't any unequivocal answer to the question whether our attempt at Federal prohibition has benefited public health or not because we have never kept records of a kind by which an answer might be given. Dr. Dublin's extremely conservative statement is the nearest that can be obtained from statistical sources in the United States at present. And evidence of another kind, which is quite indirect, comes through social practice and includes factors which are also imponderable and likely to be abused when the statistical method is applied.

I think Dr. Norris has made a point which would be accepted by all sanitarians, that the condition of housing is an important determining factor upon the state of health of a community, greater probably than alcohol has been, certainly for the majority of the people concerned. But it must be admitted that the factor which is likely to improve housing is the improved economic condition of the wage earner and I believe there is a strongly held opinion among employers of labor and among those who have records of wage earners, that the housing, clothing and feeding of the wage earning class has been improved during the last eight years, out of proportion to the increase in the absolute and relative value of wages. In other words the

outlawing of the beverage alcohol business has meant larger expenditures by the wage earner for the comfort and sanitary safety of his home and family.

The fact that there has been loss of federal tax income of one billion dollars must be offset against the fact that prior to prohibition we had an annual popular expenditure of two and a half billion dollars for liquor in so-called legitimate business, according to the Internal Revenue Bureau records.

When Dr. Norris says that the effects of prohibition have been wholly deplorable he ignores the experience of large sections of the country outside of New York City and state. If the death rates are studied for the various states and cities or regions of the country according to the attitude of the people towards local prohibition, before and after 1920, striking differences appear, indicating the great benefits which have occurred where the people are mainly in sympathy with the present law, and the lack of improvement in such cities as New York where public officers and the public press flaunt their disregard and openly encourage violation of the law.

I won't attempt to quote the considerable mass of figures which are easily available to anyone, but I would merely ask you to consider this series of particularly reliable ones prepared from the experience of the New York Life Insurance Company by the hand of Arthur Hunter, an actuary of international renown. The rates given include deaths from alcoholism, and accidental deaths from wood and denatured alcohol poisoning combined. The death rate per hundred thousand of policyholders in the period 1900 to 1906 varied from 4.0 to 4.2. In the period from 1914 to 1916 they varied from 4.0 per hundred thousand to 5.1. In the years 1924 to 1926 they varied from 1.6 to 1.7.

A reduction in death rates from alcoholism to about one-third of the pre-prohibition death rate from alcoholism can be found in most of the reliable statistics of this country wherever there has been pre-prohibition opinion favorable to limitation in the commercial traffic in beverage

alcohol. And when we say, as is true, that the death rate from cirrhosis of the liver or from alcoholism has increased 200 per cent. since 1920 and sometimes 150 per cent. in a year for two years running, in some places, we fail to speak honestly. Up to the present time there are few large communities in the United States in which the death rate from alcoholism has risen to the rate that prevailed continuously prior to prohibition, and there are various communities in which the rise in this death rate which followed the continuous failure to enforce prohibition has been followed by a subsequent fall, *viz.*, Detroit, 1927.

The death rate from alcoholism in New York City for the first six months of 1927 was lower than for the first six months of the previous year. We note a fairly uniform occurrence in all types of city, that is the sudden drop in deaths due to alcoholism in 1920-21, the rise over a period of years, which has been large or small, slow or fast according to the temper and interest of the community in the subject, then a peak which has not reached the level of pre-prohibition alcoholism, and then a beginning decline in the rate which is likely to continue in proportion to social and political action on the matter, and the effectiveness of education as to the physiological effects of alcohol.

But to say that there has been a wholesale failure of prohibition, on the basis of vital statistics is neither honest nor correct. You cannot draw conclusions from the experience of the United States as a unit. It is not safe to deal with all the various areas of the country as if they were of homogeneous population groups. You must consider your vital statistics with the same discretion you would use if you were discussing tuberculosis, Bright's disease, or heart failure, and that is to analyze them by age, sex, race, economic state, area, time of year, and conditions of employment, etc. And when such studies are made, it is perfectly evident that there has been wide difference of experience in different parts of the country just as we see variations in the use of alcohol socially. I believe Dr. Norris would do well to consider some other

evidence obtainable from official records, including those of the Census Bureau, before repeating the statement that the effects of the prohibition amendment from the public health point of view have been wholly deplorable.

As Commissioner of Health I was responsible for deciding upon the material on which the Health Department carried on an educational campaign against the use of alcohol as a cause of a considerable number of preventable deaths. Alcohol still causes preventable deaths. It is the business of the Health Department to take cognizance of and report annually upon all causes of preventable deaths as required by the charter of the City of New York. In February, 1916, I declared publicly what was at that time the attitude of the Board of Health, that it would take no interest in, and take no part in any effort to modify the social habits of individuals by legislation, and I feel just as strongly now as I did then, that the only way of making a physiological truth effective is by education, not by legislation. No hygienic measure is likely to be effective until it is understood and accepted by the people.

Legislation which interferes with the freedom and discretion of the physician in the use of any drug or poison he prefers in the care of persons coming to him seeking relief from pain and suffering is bad legislation. If physicians want to use alcohol medicinally more and more, instead of less and less, as the teachers of pharmacology in our medical schools are advising them to, they should not be interfered with by legislatures. But when it comes to a presumption that the Teutonic Elysium which Dr. Norris has presented to us is ever likely to return in the United States, I think he is optimistic to a degree. The pictured paradise of the saloon that Dr. Norris has presented to us will be, I believe, resisted by all persons who are, let us say, above the age of thirty, and have lived with or near saloons in this city or other parts of the United States. To consider it as a social ideal to have a liquor saloon because somebody, somewhere, found in the saloon something that

he called a home or center for social converse, is to my mind a fantastic reason for community atavism.

There is no longer, in most parts of this country, any excuse for what is called misery drinking. We recognize now that if social and employment conditions are so bad that men and women of the family have to resort to liquor to escape from the intolerable conditions of their living, it is our business to see that those conditions are fundamentally corrected instead of narcotizing ourselves into a condition of social complacency, and continuing the victims of an unwise and unjust human relationship.

No discussion of alcoholism or the effects of prohibition can be intelligently carried on unless we keep strictly to the facts. While the human pathology of alcoholism as presented by Dr. Norris will be widely accepted, discussion of the social effects of alcohol and its control calls for a more objective and less emotional approach than has been offered this evening.

PRESIDENT LAMBERT: I should like to make a statement for the Academy of Medicine and say that it is not necessary for the members of this Academy to agree with any speaker that speaks on this platform; that personally although I am representing the Academy, the Academy may differ absolutely with the remarks made by any speaker, yet the Academy will stand for his right to express his opinion here quite freely.

ABSTRACTS OF PAPERS DELIVERED
AT SECTION MEETINGS*Section of Medicine, April 17, 1928*

MEDICINE IN INDUSTRY*

E. H. L. CORWIN

Realizing the economic value of health and mindful of the well-being of their workers, many of the large industrial and mercantile establishments have organized medical departments in their plants. The character and extent of these medical services vary from emergency aid to the complete care of the worker and his family in illness. A large contingent of competent physicians, nurses and auxiliary staffs is being employed to carry on this work and the services rendered are of indubitable value.

The question is often raised as to the extent to which industry should attempt to provide diagnostic service and medical or surgical treatment, particularly in communities which are adequately supplied with medical resources. It was with this in mind that the following brief survey of the character and extent of medical service in industry was prepared. It is based on a study of the available data published in the medical and social service press and describes briefly under various captions what is being done and how the work is organized, thus offering a means of orientation in this large and complex field.

HISTORICAL

In this country, medical service in industry had its beginning about two decades ago. It consisted at first in emergency treatment of industrial accidents. Skilled first aid and subsequent supervision of treatment not only prevented infections and complications but reduced the period of disability.

*From a study made for the Committee on Public Health Relations.

With the advent of workmen's compensation laws, which placed upon the employer the responsibility for safeguarding the employee against accident and for providing of monetary relief for disability incurred in or arising out of employment, medical service in industry was given further impetus.

It was, however, during the period of the war that the importance of medical attention to the health of the worker became fully recognized. It has been shown that by reducing economic waste traceable to avoidable occupational hazards, to unfavorable working conditions, fatigue, ill health and other similar factors, medical service in industry helps the individual workman to deliver his output with less effort and greater efficiency. The employer has learned to recognize that the efforts of industrial physicians are economically profitable in that they conserve energy and reduce labor turnover.

Economic considerations, however, are not solely responsible for the growth of the movement. These may be paramount but it is also true that many employers are moved by humanitarian motives and in providing medical service for their employees, have sought to overcome some of the barriers between employer and employee which the increasing size of industrial organizations has made inevitable. The provision of medical service has become a means of expressing the friendly interest of the employer in the employee's general welfare.

One of the main purposes of providing treatment of employees by the companies is to reduce the loss of time due to illness. Experience has taught them that this can be attained by prompt treatment of minor ailments. Absenteeism in industry is a serious matter both for the employer and the employee.

PREVALENCE OF ILLNESS

It has been estimated that the 42,000,000 men and women gainfully employed in the United States lose annually

from illness disabilities, including non-industrial accidents, a total of 350,000,000 days.¹ The economic loss from preventable disease and death is calculated as \$1,800,000,000 among those gainfully employed and it is estimated that this loss could be reduced and leave a balance over and above the cost of prevention of at least \$1,000,000,000.¹ What can be effected has been shown, for instance, by Dr. John A. Turner, at the Laidlaw Works of the Worthington Pump and Machinery Corporation, of Cincinnati, Ohio.² The records of the medical department of the plant show that the average loss of time per workman, from industrial injuries was 2.1 days in 1920; it fell to 1 day in 1925. Industrial diseases were practically eliminated and the loss of time from non-industrial illness was reduced from 8 days in 1920 to 4.4 days in 1926. In 1926 there were 22.4 per cent. more requests for treatment than in 1925, yet the time lost was 26 per cent. less than during 1925.

In both industrial and mercantile establishments respiratory diseases are the main causes of absenteeism from work. In a recent study³ of the health of office workers in the Home Office of the Metropolitan Life Insurance Co. it was ascertained that over 38 per cent. of the illnesses causing absence, among males and females combined, were due to respiratory diseases (6.4 per cent. due to colds); 27 per cent. of illness was caused by diseases of the digestive tract. Over 11 per cent. of the causes among women were due to dysmenorrhea.

Recently the United States Public Health Service published an interesting study⁴ on "The importance of respiratory disease as the cause of disability among industrial workers." Included in the respiratory diseases are influenza and grippe, tuberculosis of the lungs, diseases of the pharynx and tonsils, colds and other diseases of the nasal fossae.

A ten year record of the Edison Electric Illuminating Company of Boston showed that 54 per cent. of absences due to illness among the employees of the company was

caused by respiratory diseases. While the average number of days lost on account of sickness among male employees of that company was 6.92 per man per annum, 3.23 days of disability were due to respiratory diseases—almost half.

The differences in the rate of respiratory illness in different establishments and in different communities due, no doubt, to the character of the industry and the environment of the establishments, are quite striking. In one establishment the incidence based on several years' experience was 17 cases per 1,000 men per annum. In the establishment having the highest respiratory rate, there were 85 cases per year per 1,000 men. In other words, there were five times as many cases of respiratory diseases causing disability for a period longer than one week per 1,000 men in the establishment having the highest respiratory incidence as in the plant showing the lowest. The prevalence of ill health is measured not only by the number of days of absence from work, but also by calls for medical attention at the dispensary. The dispensary experience of one of the concerns for which statistics are available may be of interest. The statistics given refer to a year's experience of the medical department at the Montgomery, Ward and Company mail order firm. The following tabulation showing the services rendered and the monthly averages are significant as indicative of the nature and extent of illness among this group of employees numbering about 1000 individuals.⁵

Services given for	No. of new cases	Monthly average
Colds	644	53.7
Headache	397	33.1
Dysmenorrhea	343	28.6
Gastric intestinal complaints	311	25.9
Pharyngitis and tonsillitis	212	17.7
Skin lesions	239	20.7
Eye and ear	183	15.3
Teeth	103	8.6
Lacerations on hand and finger	331	27.6
Strain and sprains	101	8.4
All other accidents	251	20.9
Minor operations	36	3.0

The experience of the Metropolitan Life Insurance Company with the office clerks at their Home Office has been published recently. The clinic maintained at the office is attended by males and females in proportions closely approximating their respective numbers in the organization. Between 85 per cent. to 90 per cent. of all persons in employment use the clinic each year, and the proportionate distribution of the various maladies remains practically unchanged year after year.

EXTENT OF MEDICAL SERVICE IN INDUSTRY

The findings of a recent survey made by the U. S. Bureau of Labor Statistics⁶ of about 450 industries indicate the enormous strides that have been made in the last decade. In 1916-17 of 375 establishments reporting, only 171 employed doctors and 181 had trained nurses, whereas in 1926 out of 373 establishments reporting, 311 employed either full time or part time doctors and 30 had doctors on call, while 332 of the companies employed trained nurses. The improvement in equipment and facilities is shown by the fact that in 1916, 110 of the 375 plants had first aid equipment consisting of only first aid cabinets and sometimes cots, stretchers and pulmotors, while in 1926 of the 375 plants, 373 had one or more treatment rooms and only 34 a limited first aid equipment.

While in 1916 only 19 of the firms under consideration employed full-time or part time dentists, and only 5 employed full time or part time oculists, in 1926, 83 of the companies furnished dental service and 32 employed oculists. At present, specialists in diseases of the ear, nose and throat and more lately, psychiatrists, are reported as being employed by factories and stores.

A further idea of the extent⁷ to which medical work is being carried on in industry may be gleaned from the statistics published by the National Industrial Conference Board in 1926. Of the 468 plants studied by the Board, approximately 995,777 persons were employed. In the

course of a year, the medical departments in these establishments took care of 1,596,160 injuries, made 3,380,503 re-dressings, handled 1,789,253 medical cases, 85,404 dental cases, and in addition, made 631,239 physical examinations.

The personnel engaged in 499 industrial plants numbered in the aggregate 1,389 physicians, 265 of whom were employed full time, 355 part time, and 769 on call; 91 dentists, 966 nurses, 254 technicians and 360 clerical assistants. The total expenditure for maintenance of staff and support of the medical work in 477 of these plants was \$5,306,132 per annum.

ACTIVITIES OF MEDICAL DEPARTMENTS

The development of the Medical Department in a given industry is dependent largely upon the size and character of the industrial establishment and the industrial hazards of the particular industry. The most complete and highly organized medical service is found usually in large scale enterprises with numerous employees and where the risk element is considerable.

The relative emphasis placed on the various phases of the work likewise depends on conditions, such as the nature and size of the industry, and the special opportunities for service under particular circumstances.

In general, the activities of the more highly organized medical departments in industrial plants may be divided into four main divisions:

1. The Preventive
2. The Diagnostic
3. The Curative, and
4. The so-called Extra-medical activities.

1. PREVENTIVE

Under the term "preventive" are classified a great many of the important activities.

a.) *Physical examination of applicants for employment and of workers returning to employment after illness.*

The purpose of this examination is to bar from employment such persons as may be suffering from communicable diseases and who may therefore, be a menace to fellow workmen; it serves also to prevent the applicant from entering upon work which would be injurious for him because of some particular physical condition.

b.) *Periodic re-examinations of workers in hazardous employments.*

This is especially important in industries where the employees are subjected to the risks of handling materials known to cause occupational diseases, such as dusts or chemicals, like benzol, aniline and its derivatives, phenol, picric acid, cutting oils, manganese, cadmium and the like. The industrial physician must be continually on the alert to detect early symptoms in order to prevent the development of diseases that arise from poisoning by these substances. In properly equipped plants where the workers are subjected to the hazards attendant upon handling such materials, provision is often made for routine re-examination at intervals, including the necessary laboratory tests.

c.) *Periodic health examinations.*

This practice is carried on at given intervals in certain plants for the purpose of detecting incipient disease. Following the examination, treatment is advised to prevent, if possible, any further development of the pathological conditions found.

d.) *Re-examination of employees suffering from physical defects which require follow-up.*

Sometimes an employee is taken on and placed in a job which may become prejudicial to his health or safety, if certain conditions found upon physical examination are not remedied. Such employees are kept under surveillance and re-examined at intervals. If necessary, they are placed at other employment either temporarily or permanently if their condition at any time should require it.

The taking on of workmen with physical defects is inevitable and it is the responsibility of the industrial physician to place them at tasks which they may perform with relative safety to themselves and others.

e.) Placing of physically defective workmen.

In some large plants, places are found for a limited number of defective workers, and in some instances even totally blind, or workers with missing arms or legs, or mentally deficient are usefully employed. The safeguarding of the cripples and the handicapped is a responsibility of the factory medical staff.

f.) Sanitation of workshops and maintenance of satisfactory working conditions, prevention of accidents, etc.

The duties of the industrial physician sometimes include coöperation with the engineering department in the study and control of such matters as ventilation, illumination, heat and humidity, dust, drinking water, sewage disposal, cleanliness of toilets and locker rooms, windows and electric lights, collection and disposal of refuse and extermination of insects and vermin. The sanitary inspection of the plant is usually an important duty of the industrial physician.

g.) Health education of workers.

Instruction in personal hygiene is usually carried on under the supervision or direction of the medical officer by nurses or other functionaries. Under this caption should be included the encouragement of athletics, games and outdoor recreation.

2. DIAGNOSTIC

Diagnostic skill is called for in handling the cases of applicants for positions, in the periodic re-examination of employees described above, and in the treatment of sickness among the employees whenever this is a part of the

medical service. The factory doctor often aids the physician in the community by placing at his disposal such superior equipment or ability as he may possess for the benefit of the patient. Skill in diagnosis is frequently called for in the equitable adjustment of compensation cases.

3. CURATIVE

a.) *Treatment of medical cases.*

In some industries treatments of all kinds of illness is provided for the employee either at the hands of the medical department or by arrangement with outside agencies, the community hospital or the private practitioner of medicine.

b.) *Treatment of injuries.*

One of the chief duties of the medical department in an industrial plant is the treatment of injuries sustained in the course of work. These are mainly of a minor nature. In the Industrial Conference Board's study, it was found that in 207 factories employing 800,000 employees, only 2.86 per cent. of the injuries were sufficiently severe to justify compensation claims.

c.) *Redressing of wounds due to injuries.*

This work may consist of redressing wounds treated at the plant dispensary or the care of wounds originally dressed elsewhere in cases where the injury was too severe to treat at the plant dispensary in the first instance.

d.) *Hospital care.*

Some industrial plants are equipped with complete hospital and convalescent facilities for the care of their employees in any emergency whether their illness be due to their employment or to other causes.

e.) *Home care.*

Some plants provide medical attention to sick employees in their homes. Nurses may be sent to the home to give

whatever attention may be necessary and the physician may treat the patient in the home as well as in the dispensary.

4. EXTRA MEDICAL ACTIVITIES

This includes social service in the home or elsewhere, advice on medical problems, the giving of information as to where to obtain medical aid of one kind or another, and the like. Furthermore, within the scope of the industrial physician's work come such matters as the settlement of workmen's compensation cases; accident investigations; safety work and study of hazards in plant processes; supervision of mutual benefit associations in the plant; supervision of recreational activities of employees; supervision of the plant restaurant or the cafeteria service and the keeping of records.

As will be readily seen from this inadequate listing of activities, the opportunities of industrial physicians are extensive and vital in character.

STAFF AND EQUIPMENT

The personnel of the medical departments found in industrial organizations includes both general practitioners and specialists engaged either on a full or part time salary basis, or on call as well as nurses, technicians and clerical workers.

Full time physicians are usually employed by the larger establishments of 2,000 employees or over and in plants where the employment is extra hazardous like mining, while part time, or "on call" arrangements prevail in the smaller establishments or where there are assistants to full time physicians.

Nurses carry on the greater part of the work in establishments where the physician is merely on call or act as assistants to the physicians in the plants. Many of the medical departments in industrial and mercantile establishments employ the nursing personnel for home visitation of the sick.

Equipment may vary from the simplest dispensary to a complete hospital equipped to deal with all types of conditions. Over 95 per cent. of the factories in the United States employ less than a thousand workers and the small dispensary is the usual provision. In factories located in small towns with no other adequate medical facilities, the factory dispensary is well equipped and very often X-ray and laboratory work is done in the factory laboratory at a small charge at the request of the doctors in the community.

ADMINISTRATIVE RELATIONS

The medical department in an industrial plant may be under the jurisdiction of the employment department, the industrial relations manager or the production manager, or it may exist as an independent unit. It is held by most authorities that the medical department can do its best work when it is given the status of an independent department.

COST OF MEDICAL SERVICE IN INDUSTRY

Costs vary with the industry and the type of service. Several surveys have been made to determine costs. One study carried on by the Conference Board of Physicians in Industrial Practice in 1917, included 95 factories. The average annual cost of medical and surgical supervision was calculated at \$2.21 per employee. This figure is hardly representative of present day costs. In 1920 a survey of 1,521 factories was carried on by the Cleveland Hospital and Health Survey. In 72 factories which reported some type of medical service the average cost of medical service per employee was computed at \$5.00 per annum. There was, however, a wide variation among the industries, some reporting as high as \$11.23.

The more recent study conducted by the National Industrial Conference Board brings out this same variation in costs of medical service among the various industries.⁷ In mining it is \$13.86 per employee per annum; the next highest cost is in the smelting and refining industry where it

averages \$7.49 per capita, while the lowest is \$2.65 for the department stores.

Measured in terms of the payrolls of the factories, the aggregate cost of medical service in the industries studied was \$3.60 for every \$1,000 of the payroll. Measured by the value of the product it is found that for every \$1,000 worth of product, medical costs reported amount to \$1.02.

Costs per treatment range from 19 cents in some cases to \$1.45 in others. In some instances the patients pay for medical service either at full cost or at a nominal price, while in others medical service is entirely free.

In the aggregate, the major item of cost is that of salaries of physicians and nurses. It amounts to 57.1 per cent. of the total expenses reported. Salaries of clerical and other assistants constitute 8.4 per cent., making 66.5 per cent. the total charge for the professional and clerical personnel.

There is great variation in the salaries paid industrial physicians. Clark⁸ reports the following schedules: Working on a basis of two or three visits to the plant per week, the average fee is about \$3.00 each visit lasting about one hour. A special fee is charged for calls to plants outside of visiting hours. Part time doctors spending about three hours daily receive from \$1,200 to \$1,500 a year, but in the case of highly trained men the salaries are much higher. Full time service is paid at the rate of from \$1,800 to \$5,000 per year, depending on the experience of the physician. In large plants of over 4,000 employees, the physician's salary is \$10,000 and more. As a rule, the figures mentioned are in addition to equipment, transportation, supplies and in some cases maintenance is also provided.

CONCLUSIONS

Medical service in industry is evidently no longer an experiment, but a well established feature of modern business organization. It has seemingly demonstrated its value to the health of workers and to the benefit of industry. As the opportunities for scientific work increase and as compensation becomes more adequate, larger numbers of competent medical men are being attracted to the service, on either a whole or part time basis. They realize the many contributions which by virtue of their position they can make to medicine and to social welfare. Occupational hazards and industrial hygiene have not received in this country the study and attention their importance warrants: nor has the existing knowledge been applied with sufficient thoroughness, except in selected industries or in individual establishments. The expansion of medical service in industry may considerably advance governmental and private endeavors in this direction.

APPENDIX

Since the writing of this report, the U. S. Bureau of Labor Statistics published a bulletin⁹ prepared by Anice L. Whitney. One chapter of this bulletin is devoted to the medical service provided by industry. The following two tables are taken from this report. They give interesting statistical data by types of industry.

Number of establishments having emergency hospitals or first-aid equipment and number and class of medical attendants, by industries: ⁹

Industry	Number of establishments	Employees			Number of establishments reporting					Attendants trained in first aid
		Male	Female	Total	First aid equipment only	Hospital or emergency rooms	Doctor	Nurse		
Automobiles	19	239,006	8,933	247,939		19	16	18	7	
Boots and shoes	5	14,959	10,081	25,040		5	4	5		
Chemicals and allied products	7	9,245	4,660	13,905	2	5	5	5	2	
Clothing and furnishings	16	8,367	19,100	27,467	8	8	7	7	6	
Electrical supplies	18	61,578	18,259	79,837	1	17	15	16	3	
Fine machines and instruments	13	38,774	14,418	53,192		13	12	13		
Food products	12	11,826	8,711	20,537	1	11	8	8	2	
Foundries and machine shops	49	112,116	13,091	125,207		49	44	40	13	
Iron and steel	11	†277,905	†15,479	302,384		11	11	9	4	
Mining, coal	7	†26,183	†102	†26,285	2	5	7	2	9	
Mining, other	16	23,219	60	23,279	1	15	14	14	4	
Offices	18	16,513	23,350	39,863	2	16	15	16	2	
Ore reduction and smelting	6	8,593	152	8,745		6	4	4	1	
Paper and paper goods	10	8,605	3,264	11,869	2	8	8	8	2	
Printing and publishing	5	4,854	3,781	8,635		5	1	4		
Public utilities (gas, electric light and power, telephone and telegraph)	17	88,423	33,658	122,081	3	14	15	11	3	
Railroads, steam and electric	13	†113,387	†6,360	352,145		13	12	10	2	
Rubber and composition goods	11	51,733	13,685	65,418		11	8	11		
Stores	51	†46,602	†84,695	136,850	1	50	39	49	2	
Textiles	43	39,214	34,921	74,135	3	40	33	38	6	
Other industries	60	†100,028	†29,309	143,075	8	52	33	44	10	
Total	407	‡1,301,130	‡346,059	†1,907,888	34	373	311	332	75	

†Not including employees of 1 establishment not reported.

‡Not including employees of 3 establishments not reported.

§Not including employees of 7 establishments not reported.

Number of companies reporting cases treated and average number of accident and medical cases and retreatments per month, by industries:

Industry	No. of establishments	No. of employees	Average number of cases treated per month			
			Accident	Medical	Total accident and medical	
			New	Total, including retreatments	New	Total, including retreatments
Automobiles	12	190,989	70,999	162,884	43,814	44,823
Clothing and furnishings	2	4,860	480	607	1,027	1,244
Electrical supplies	7	39,516	6,498	18,890	8,593	9,332
Fine machines and instruments	5	15,826	2,721	8,288	3,129	3,759
Food products	3	10,554	2,836	3,903	3,091	3,210
Foundries and machine shops	†17	38,638	6,995	16,465	8,157	16,437
Gold and silver ware	2	3,605	503	1,239	514	514
Iron and steel	‡3	18,200	1,926	10,648	204	711
Oil refining	1	13,738	1,139	4,671	1,637	3,814
Offices	2	10,593	1,004	2,596	2,162	4,152
Ore reduction and smelting	1	2,600	702	1,979	185	185
Paper and paper goods	5	5,412	579	1,365	1,508	2,058
Printing and publishing	2	5,511	425	1,211	2,404	3,404
Public utilities (gas, electric light and power, telephone and telegraph)	3	51,918	7,440	15,868	12,966	14,312
Railroads, electric	1	12,000	300	1,035	260	495
Rubber and composition goods	6	33,489	7,879	16,037	8,443	13,421
Slaughtering and meat packing	1	7,700	500	2,000	400	1,000
Stores	4	14,850	943	1,240	3,370	4,854
Textiles	12	32,255	3,062	10,884	6,343	7,958
Other industries	9	16,254	3,635	8,634	4,936	8,431
Total		\$98 528,508	120,566	290,444	113,143	144,114
						233,709 434,558

† Including 1 establishment in which no medical cases are treated.

‡ Including 2 establishments in which no medical cases are treated.

§ Including 3 establishments in which no medical cases are treated.

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⁸ W. Irving Clark, M.D.—“Health Service in Industry,” p. 105; Macmillan, 1922.

⁹ Health and Recreation Activities in Industrial Establishments, 1926 *Bulletin U. S. Bureau of Labor Statistics*, No. 458, Washington, 1928.

red cells and in the percentage of hemoglobin speaks for a diagnosis of acute hemorrhagic mastoiditis, and indicates an immediate simple mastoidectomy where all other conditions have been eliminated. Since the lesion in this type of mastoiditis is present in the small vessels within the mastoid process, the hemolytic streptococci present within the infected thrombi destroy the hemoglobin and the red cells of the blood stream. This is evidenced by the gradual fall in the number of red cells and in the percentage of hemoglobin.

After a simple mastoidectomy in this type of mastoiditis, thorough exenteration of the mass of infected thrombi is followed by a subsidence of the sepsis and a gradual return of the red cells and hemoglobin to normal. Should the reduction in the red cells and hemoglobin continue after the simple mastoid operation, a further extension of the disease into the lateral sinus should be suspected, and a transfusion of whole blood is in order. If the reduction still continues, the lateral sinus should be obliterated and the internal jugular vein ligated regardless of whether or not the outer wall of the sinus is diseased. Since the sinus thrombosis in this type of mastoiditis is produced by the intravenous extension of the minute thrombi directly into the lateral sinus, there will rarely be found any erosion of the sinus plate or any evidence of a periphlebitis. In this type of mastoiditis, continued reduction of the red cells and the hemoglobin after operation furnishes a better diagnostic aid than the appearance of the sinus wall.

In the acute coalescent mastoiditis, a daily study of the red cells and hemoglobin throughout the period of hospitalization subsequent to operation will always lead to an earlier detection of a sinus thrombosis where a hemolytic organism is the offending factor. In these cases, the earliest appearance of a thrombosis will be manifest in a gradual daily decline in the number of red cells and the percentage of hemoglobin. Where the hemoglobin falls steadily, and where the clinical signs of sepsis are absent, a transfusion will replace the lost hemoglobin and so add to the patient's

resistance. On the other hand, a persistent unilateral headache after operation, accompanied by an increased leucocytosis and a gradual fall in the number of red cells and the percentage of hemoglobin, should lead one to inspect the interior of the sinus for the presence of a thrombus. The utilization of the red cell and hemoglobin estimation as a routine in every case of mastoiditis will afford an early guide in the detection of otitic sepsis, whether it be due to an acute hemorrhagic mastoiditis or to a complication of an acute coalescent mastoiditis or to a chronic mastoiditis.

The White Cell Count:

The study of the *white cells* furnishes us with a diagnostic as well as a prognostic aid. In the ordinary white cell count, the otologist is interested in the total number of white cells and the percentage of polynuclear cells. The former is the index of the resistance of the individual while the latter indicates the severity of the infection. Utilizing this as a foundation, McKernon drew up a chart whereon the total number of leucocytes could be compared with the percentage of polynuclear cells. He determined that with a given number of leucocytes a patient could present a certain maximum percentage of polynuclear cells before his resistance was overcome by the virulence of the infection. Once this was determined, we had at our disposal an excellent prognostic guide. Knowing the maximum number of polynuclears that is compatible with any given leucocytosis, we can determine at a glance whether or not the patient has sufficient resistance to combat the infection. Where the percentage of polynuclears exceeds the maximum allowed for any given number of leucocytes, the patient's resistance is succumbing to the infection. On the other hand, where the polynuclear percentage is less than, or equal to, the maximum allowed for any given total leucocytosis, the resistance of the patient is good. The use of these resistance charts will be found of inestimable value in prognosticating the outcome of any otitic infection.

The white cell count is also of value as an indication of an impending complication. After a simple mastoidectomy, the white cell count should show a rapid decline toward normal. A persistent leucocytosis with an increase in the percentage of polynuclear cells is indicative of a continued infection. A careful observation of the patient is necessary in such cases to determine the source of the infection that is causing the leucocytosis to persist. Most frequently it is due to the continuation of purulency in the middle ear; and an increased white cell count may be noted until the middle ear infection has subsided. If, however, the increased leucocytosis is accompanied by a unilateral headache, an extension of the disease beyond the mastoid process should be suspected. Where, following operation, the leucocytosis subsides only to recur after an interval of time, accompanied by unilateral headache, a sinus thrombosis should be strongly suspected. I have had several cases of sinus thrombosis subsequent to the acute coalescent mastoiditis wherein the only signs that led to a diagnosis of sinus thrombosis were the persistent unilateral headache and the increased leucocytosis. In these cases I had no other signs or symptoms of sepsis on which to base a diagnosis.

Recently I have had experience with the method of counting the white blood cells devised by Schilling and introduced at Beth Israel Hospital by Dr. Arthur Weiss. In brief, the count is made as follows: The total number of cells is tabulated as heretofore. In the differential count, however, particular attention is paid to the various morphological forms of the polynuclear cells. One notes the percentage of mature polynuclear, that is, those in which the nucleus has undergone complete segmentation, and the percentage of young polynuclears, wherein the nucleus is still unsegmented and appears in the form of a rod. The latter type are called the "staff cells." In a normal count, the young forms, or staff cells, number less than 5 per cent. At the onset of an acute infection which produces a polymorphonuclear leucocytosis, there occurs a marked increase in the number of these immature staff cells. This

is due to the fact that the bone marrow is stimulated to produce an excess amount of polynuclears to combat the infection and these cells are thrown into the general circulation before their nuclei have had time to undergo complete segmentation. In addition to this, the percentage of lymphocytes diminishes. This picture has been termed a "shifting to the left." As the infection subsides, the number of staff cells also becomes less until "normal" is finally reached. The blood picture does not have any relationship to the temperature curve but is in direct relationship to the virulence of the infection and the resistance of the patient. Where, following a simple mastoidectomy, the number of staff cells continues high, that is, above 15 per cent., it is indicative of a continuation of the infection. It is not diagnostic of any complication but it should put the surgeon on guard to watch for the clinical signs of a complication. The continuance of a high staff count, or the reappearance of one after it has returned to normal subsequent to aural surgery, should be viewed with the utmost suspicion.

I have found this method of counting the white cells of inestimable value in determining the procedure to be followed in the so-called borderline cases. Where a mastoiditis is presented and one is in doubt as to whether or not to operate, the staff cells will furnish an excellent guide in helping one to reach a decision. Where the staff cells increase in number on several daily examinations and reach 12 per cent. or more, operation is indicated. On the other hand, where the percentage of staff cells remains stationary below 12 per cent., or shows a gradual reduction, operation can be postponed with safety and the patient kept under further palliative treatment.

Blood Culture:

Before discussing the results of blood culture and the importance to be attached thereto, I should like to discuss as briefly as possible the pathogenesis of a sinus thrombosis. In the acute coalescent and the chronic mastoiditis, there occurs a gradual destruction of the mastoidal

structure until the inner table is reached. The inner table overlying the sinus is then subjected to pressure from the pent-up pus and undergoes necrosis. The outer wall of the sinus is thus brought into direct contact with the purulency within the mastoid process. The pressure against the wall of the sinus causes a narrowing of the blood channel with a consequent slowing of the blood stream. In addition, the outer wall of the sinus becomes infected by the pus in the mastoid process and we then have a sinus periphlebitis. If the mastoid is operated upon at this point, there is found a protective layer of granulations over the sinus wall at the exposed area. On the other hand, should this periphlebitis be permitted to progress so as to involve the endothelial lining of the sinus, the injury presented to this lining membrane, plus the narrowing of the channel and the slowing of the flow of blood, offer all the elements necessary for the production of a thrombus formation. This thrombus is protective in nature and is at first sterile. If the round cell infiltration and granulations on the outer coat of the sinus are not sufficient to keep out the organisms from within the sinus, the thrombus will become secondarily infected and we then have an infected thrombus within the sinus. This thrombus grows with and against the blood stream and only its central portion is infected; its extremities are sterile. Therefore, if a blood culture is taken at this stage of the thrombosis, no growth of organisms will be noted. If nature is successful in localizing the infection by causing a fibrosis of the thrombus, a positive culture will never be obtained. It is only when the thrombus has undergone disintegration that infected particles will gain entrance to the general circulation and on culture of the blood a positive growth of bacteria will be obtained. To permit every sinus thrombosis to go on to this stage before operative intervention is undertaken, is not in accord with the best principles of surgery. One does not wait for an acute suppurative appendicitis to rupture before removing it surgically. So, in otology, one must not view a negative blood culture as ruling out the presence of an infected thrombus within the

sinus where the clinical symptoms point to its presence. Too much reliance has been placed upon the blood culture as a means of diagnosing sinus thrombosis. It has its value as a diagnostic measure but is not nearly as reliable in the greatest proportion of cases as the red cell and hemoglobin estimation and the white cell count. The findings at the primary operation on the mastoid process, coupled with the appearance of temperature, unilateral headache, etc., are also of far greater diagnostic value than the results of blood culture. In the last 18 cases of sinus thrombosis upon which I have operated, the blood culture was positive only in four of them. In two instances wherein I had obtained a positive blood culture of streptococcus hemolyticus in cases of sepsis subsequent to mastoid surgery, I excluded a sinus thrombosis from the clinical picture presented by the patients because of other factors. In both instances the patients recovered without resort to surgery on the blood vessel.

A positive blood culture is more apt to be found in cases of sinus thrombosis subsequent to the hemorrhagic mastoiditis. Here the thrombosis in the lateral sinus is the result of the direct growth of a smaller thrombus from one of the venules in the cellular walls into the larger vessel. The sinus plate is not eroded, no perisinus abscess is found and there is no involvement of the outer coat. The thrombus in this instance is infected from the outset and is more often of the mural than the occluding type. The blood stream, in passing, washes some of the organisms into the general system, and a positive blood culture is obtained much earlier than in the thrombosis following the acute coalescent mastoiditis.

In addition, a negative blood culture is to be expected where metastatic lesions are present. These lesions, particularly if they are located in the soft parts, act as fixation abscesses and clear the blood stream of infection. If the bacteria gain entrance to the pulmonary circulation, they are apt to lodge there and produce their characteristic lesion without ever reaching the general circulation.

Blood Sugar:

A blood sugar determination should always be part of the routine examination of any adult suffering from a mastoiditis. A diabetic who is under treatment will often show no sugar in the urine while an estimation of the blood sugar will reveal a hyperglycemia. Diabetes produces that type of ear lesion which has been termed the painless type of acute coalescent mastoiditis. An extensive necrosis of the mastoid process may exist and yet the patient have no pain nor tenderness. Where the otoscopic picture and the duration of the disease point to a definite acute surgical mastoiditis but where, because of the absence of pain and temperature, one is inclined to temporize, the finding of an increased blood sugar is a warning of the danger that diabetes presents. If such a case is permitted to proceed without surgical intervention, the pain and temperature will eventually appear concomitant with an intracranial lesion.

The Cerebrospinal Fluid:

Lumbar Tap: A lumbar puncture is indicated in every case of chronic suppurative otitis media before operation is undertaken on the mastoid process. It is indicated in every case of postoperative simple mastoidectomy wherein an intracranial lesion is suspected. The information to be gained at the time of the tap is the amount of intraspinal pressure and the presence of a block between the intracerebral and the intraspinal subarachnoid spaces. The latter can be determined by noting the rise in manometric pressure following jugular compression. If the spinal fluid is permitted to run into a mercury manometer, the pressure of the spinal fluid can be read. If pressure is then brought to bear over the internal jugular vein, first on one side and then on the other, a rise is noted in the intraspinal pressure where no obstruction exists between the intracranial space and the spinal column. Incidentally, Trobey and Ayres have utilized this procedure in the differential diagnosis of sinus thrombosis in cases of bilateral mastoiditis. The side whereon the thrombus is

present is obstructed and consequently compression of the internal jugular on that side will cause no rise in the intraspinal pressure. I have utilized this procedure to great advantage and found it to be an excellent diagnostic measure. It is not infallible, however. Where a thrombus is not of the obliterating type, compression of the jugular will permit a rise in intraspinal pressure. Then again, in one of my cases wherein I had completely obliterated the lateral sinus after incision and resection of a portion of the outer wall, but wherein the internal jugular vein had not been operated upon, compression of the internal jugular vein on the side of operation caused a rise in intracranial pressure equal to the rise obtained from compression of the opposite internal jugular vein. This case has been reported by me elsewhere.

In cases of acute labyrinthitis following suppurative otitic disease, the spinal fluid will serve as a diagnostic measure in determining whether or not the labyrinthitis is of the suppurative type. Where the spinal fluid shows no increase in the number of cells, has a normal chemistry and shows but a slight increase in pressure, the labyrinthitis is of the serous variety. On the other hand, where a large increase in cells is noted and the albumin is increased, a suppurative labyrinthitis is to be suspected. If the increase in cells is predominantly lymphocytic, one can continue to employ palliative measures. Where the increase is largely polynuclear, a threatened invasion of the subarachnoid space is indicated and operation is advisable. This is especially true if, on successive taps, a high lymphocyte count is found to be replaced by a high polynuclear count.

If examination of the spinal fluid shows a high cell count, lymphocytic or polymorphonuclear, increased albumin and globulin and increased pressure, but no bacterial growth, one is dealing with a sympathetic meningitis. This is always indicative of a threatened invasion of the subarachnoid space. It can be produced by a sinus thrombosis, brain abscess or suppurative labyrinthitis.

Where such a fluid is obtained, every measure must be employed to eradicate the focus of infection immediately, if a suppurative meningitis is to be averted.

One of the earliest findings in the spinal fluid in cases of suppurative meningitis due to a fermentative type of bacteria is a reduction in the percentage of glucose normally found in the spinal fluid. This is often demonstrable even before any organisms can be isolated. Where the copper reduction is absent or diminished, a suppurative meningitis can be diagnosed even though no bacteria can be isolated on smear or culture.

Bacteriology:

A culture of the pus from the middle ear is of no value unless taken very soon after the paracentesis or spontaneous rupture of the drum. Cultures taken after twelve hours or so will almost always show a mixed infection due to contamination. A culture of a chronic aural discharge is of no value at any time because the organism isolated is usually different from that which produced the lesion originally.

There are only four organisms which when isolated from an aural discharge influence the management of a case: The Klebs-Loeffler bacillus, the Vincent's bacillus and spirillum, the streptococcus mucosus capsulatus and the Friedländer's bacillus. The bacillus of diphtheria naturally indicates specific treatment with antitoxin. The Vincent's bacillus and spirillum necessitate salvarsan. The other two organisms depict an extremely dangerous type of lesion, insidious in character and asymptomatic in its course. Because of the very nature of the disease, it often goes on to intracranial invasion with no clinical evidence of its progress. Hence the finding of the streptococcus or the bacillus mucosus capsulatus indicates early complete surgery on the mastoid process in order to forestall intracranial invasion. It is true that a number of cases wherein these organisms have been found recover without any operative measures, but the seriousness of the mastoiditis

due to these bacteria must be considered from the standpoint of the high mortality presented.

Roentgenographic Examination:

Roentgenographic examination of the mastoid process is to be considered an accessory laboratory aid in otological diagnosis. The otologist should be able to interpret the findings on radiographic examination of the mastoid himself. One cannot expect the roentgenologist to make a clinical diagnosis from the plate; and the roentgenologist who does so is presumptuous unless he is specially trained in otologic pathology. An x-ray examination will yield anatomical data and will show whether or not cellular destruction is present. It will not label the case as surgical or non-surgical, acute or chronic, emergent or non-emergent. This the otologist alone can determine by a correlation of the clinical, laboratory and x-ray findings.

In every acute middle ear infection, a clouding of the mastoid process will be noted. This is due to the edema of the cellular lining which accompanies every acute middle ear suppuration. The same cloudiness will also be found in cases of external otitis accompanied by inflammation of the periosteum over the mastoid process. In the absence of any evidence of cellular destruction, the finding of a cloudiness of the mastoid process has no significance from a clinical standpoint.

Where the diminution in illumination is accompanied by evidences of cellular destruction in an acute middle ear infection, an acute coalescence of the mastoid cells is indicated. Here, however, the clinical appearance of the ear and the general systemic reaction will guide the surgeon in his determination as to whether or not the case is a surgical one. A certain amount of mastoidal destruction may exist and yet the case may recover without surgical intervention on the mastoid process. In such instances successive mastoid plates are valuable to check the progress of the destruction. In a patient who has had one or

more attacks of mastoiditis prior to the current acute attack, the finding of cellular destruction on the mastoid plate may be the result of the previous mastoid inflammations. Here, also, repeated x-ray examinations are valuable in determining whether there is an extension of the destruction.

In a case which has been under observation for a greater length of time than that usually required for the cessation of an acute aural suppuration, the finding of an extensive cellular development of the mastoid process with a small amount of destruction would tend to indicate a beginning chronicity and operative interference is usually advisable before complete destruction occurs. On the other hand, the same amount of destruction in a small mastoid process would indicate that the infection was being walled off and would recede of its own accord.

Very frequently, on a well-taken plate, an erosion of the sinus plate or tegmen can be noted by a break in the continuity of the shadow cast by these structures. In this way an epidural or perisinial abscess can be detected.

In the chronic purulent otitis media, a sclerosis of the mastoid process will be noted in every case. This is not to be interpreted as indicating a radical mastoid operation for it will be found in all cases—dangerous and non-dangerous—of chronic purulent otitis media.

In taking plates of cases with severe prostration, a septic temperature curve and a bacterial report of streptococcus hemolyticus, the negative finding of undestroyed intercellular bony walls is a clue to the fact that we are dealing with the hemorrhagic type of mastoiditis. In other words, failure to find bone destruction is substantiation of the diagnosis of hemorrhagic mastoiditis and usually indicates surgical intervention.

In discussing the laboratory aids at our disposal in the diagnosis of the non-suppurative otitic diseases, I am sorry that I will not be able to speak as definitely as I have of

their help in the suppurative otitis. Our main problem in this field is deafness and I feel that laboratory medicine will do more to help solve this problem than anything we may do in perfecting the testing of hearing. All our hearing tests have until now done nothing but confuse us. They have afforded us a classification of deafness which is largely erroneous and which, used as a basis for investigation, has misled us. Permit me to digress for a moment to make clear just what I mean. For example, a hearing test may yield results characteristic of a so-called catarrhal deafness and yet an acoustic neurofibroma is found to be the cause of the loss in hearing. A typical hearing test of a so-called otosclerosis is found to be due to syphilis of the central nervous system. These are actual occurrences from my practice and I could quote many others.

I have accordingly come to view deafness from a different standpoint—whether or not it is progressive in character. Some patients in whom a loss of hearing is present will never get worse, whereas others show a gradual progression of the loss in hearing acuity. Consequently, the division of deafness into progressive and unprogressive types permits a study of this condition from a new angle; namely, what causes the deafness to progress. That the cause may be different in each case is granted. Whether it is endocrine, toxic, infectious, the result of inherited latent characteristics or the product of faulty metabolism, is yet to be determined. In all probability each of these factors plays a role.

Blood Chemistry:

In studying these cases, Almour and I have found that most patients with progressive deafness show a derangement of the calcium content of the blood. In cases of long standing, a decrease in the calcium content is noted. In the more recent and active cases, an increase is more apt to be found. In conjunction with the calcium derangement, a great number of the cases show a high uric acid in the blood.

Just what the significance of this finding is, I do not know. We originally reported it as an observation and as an aid in the diagnosis of chronic progressive deafness. While we have several theoretical explanations, we are as yet unable to account for it definitely. Nevertheless, I consider it a valuable diagnostic aid, in helping to differentiate the progressive from the stationary types of deafness.

Wassermann:

The Wassermann test should be a routine procedure in all cases of deafness. Syphilis does not always yield the typical acoustic reactions of a nerve deafness, either with the forks or with the audiometer. Where, on examination of the blood, a negative Wassermann is obtained but syphilis is strongly suspected from the clinical data, a spinal fluid Wassermann and colloidal gold test are advisable.

X-Ray:

In the diagnosis of deafness, too, the x-ray holds forth a possibility of help. Joseph C. Beck, in 1915, made a preliminary report of the finding of changes in the long bones in cases of otosclerosis. With a view to checking his findings and learning what possible lesions might be presented, I had Dr. Henry K. Taylor make a roentgenographic study of the long bones in several of my cases of deafness. In those cases wherein I had made a diagnosis of progressive deafness, Dr. Taylor reported changes in the periosteal coverings of some of the long bones. In two of the cases he found early evidences of cystic formation in the cranial vault indicative of an early Paget's disease. In those cases which were non-progressive in character, no abnormalities were found in the skeleton. Here also I am unable to explain the findings. I simply submit them for your study and future investigation.

The correct estimation of laboratory criteria removes many cases in otologic practice from groups to which preconceived routine therapy is applied. It permits an individualization of treatment according to the given case because it furnishes data so significant as to differentiate

conditions which appear clinically alike. Thus details of pathology are better comprehended, the management of cases becomes increasingly resourceful and results are more uniformly successful.

In conclusion, I desire to stress the importance of the role which bedside observation plays in all otological cases and to emphasize the need of accurate clinical observation. In the last analysis, it is good clinical judgment which furnishes the foundation upon which laboratory aids build in making diagnoses.

Section of Otology, May 11, 1928

UNUSUAL CASE OF CHRONIC MASTOIDITIS

JOHN HORN

A case of bilateral otitis media, purulenta chronica, chronic mastoiditis. Right ear with a fistula in the outer border of the posterior wall of the external auditory canal. Simple mastoid operation. Recovery.

Patient, a girl of fourteen, who gave a history of having had discharging ears for seven years. Examination, October 16, 1926, showed both canals filled with a foul smelling secretion; drum membranes lacking—no ossicles present. The outer border of the posterior wall of the right external auditory canal showed a fistula containing thin pus. This was carefully probed, the probe entering a cavity. A crucial incision was made through the opening and with a blunt curette some diseased bone removed. Simple mastoid operation three days later. Bone was found markedly sclerosed and deep layer of cells diseased; thorough curetting, especially in the region of fistula. Small area of sinus exposed during operation. Wound was drained with gauze strips and closed with catgut sutures. Uneventful recovery. Discharged from the hospital after three days.

Post-operative treatment of O.M.P.C., both ears with Unguentum Credé (Horn). Right ear dry after six weeks. Except for the fistulous opening there were no other symptoms. The left ear still has a slight colorless discharge. Hearing in both ears has improved.

SHORT REPORTS OF FIVE INTERESTING CASES
OF ACUTE MASTOIDITIS

CLARENCE H. SMITH

CASE 1

William G., aged 30, admitted to hospital February 9, 1928, unable to walk, violent vertigo, falling, nausea and vomiting; nystagmus to healthy side, total deafness diseased ear. Acute inflammation right ear one week's duration. Myringotomy improved subjective symptoms. Simple mastoid operation alleviated all symptoms tremendously and recovery was rapid and complete, except that this labyrinth was completely ablated. This was acute suppurative labyrinthitis complicating acute purulent otitis media.

CASE 2

Pasquale M., aged 35, admitted to hospital February 22, 1928, acute suppurative mastoiditis left, complaining vertigo, nausea and vomiting; nystagmus to diseased side and hearing present in diseased ear. Had had these symptoms three weeks. Extensively necrotic mastoid found on Schwartze operation. Subjective symptoms improved, became dispensary patient for dressing. March 18, brought back to hospital fulminating meningitis. This was another case suppurative labyrinthitis complicating acute purulent otitis and mastoiditis which went on to meningitis.

CASE 3

Jack T., 3½ years of age, ordinary case mastoiditis, March 16, 1928, apparently usual convalescence, but 19 days after operation child had two rises temperature to 105. On examination marked anemia found, hemoglobin 50 per cent., other symptoms negative, except low grade septic temperature which persisted for a few days. Transfusion April 3 of 150 c.c. blood, but fever was unimproved. April 8, temperature peak became higher, to 105. Marked enlargement cervical glands, side of mastoid. Blood count now showed leucocytosis 24,000. Another transfusion, this time of 250 c.c. blood, given and temperature dropped, then complete recovery.

CASE 4

Joan S., 2½ years of age, first seen January 27, 1928, with history that she had been running daily temperature from normal to 105 for seven days. Double myringotomy, marked unilateral cervical adenitis. Recession fever for few days, but high range recommenced, temperature from 96 to 106. Double mastoidectomy. For nine days daily rise to 102. Then higher range to 104 and more. Transfusion 160 c.c. blood for hemoglobin of 50 per cent. Temperature persisted. Second transfusion 15th post-operative day with 250 c.c. blood, brought temperature down to daily rise of 101, this persisted for 12 more days, when peak became higher again, around 103. Cervical adenitis had continued all this time. Tonsillectomy performed, clearing up glands and bringing temperature to normal permanently. This was case of double acute suppurative mastoiditis of virulent type, complicated by cervical adenitis caused by infected tonsils.

CASE 5

Florence A., 2½ years of age, first seen February 15, 1927, with scarlet fever, pertussis and subperiosteal abscess right. Mastoidectomy, sinus plate necrotic, sinus exposed. Seven days later complication of bronchopneumonia. In paroxysm pertussis, sigmoid sinus ruptured, bleeding controlled by tight packing. Twelve days later another and very severe hemorrhage from sinus. Transfusion. Second transfusion, pyemia, positive blood culture. About two dozen pyemic abscesses. Third transfusion. Ligation internal jugular under local anesthesia. Fourth transfusion. Fifth transfusion. Mastoidectomy opposite side. Bronchopneumonia opposite side. Secondary mastoid operation original side. Modified radical operation original side. Recovery after seven months in hospital.

THE FINDING OF CONTRACTION OF THE VISUAL FIELDS IN CASES OF PROGRESSIVE DEAFNESS

REPORT OF CASES AND A COMPARISON WITH CASES OF DEAFNESS OF OTHER TYPES

MARK J. GOTTLIEB

According to the understanding herein implied, progressive deafness is a condition in which the hearing organ becomes gradually more deficient in the capacity to perceive and convey sounds to the brain. It is caused by some constitutional abnormality and therefore may also be termed "constitutional" deafness. It occurs more frequently in women than men. It may begin at any age, but it more commonly has its onset in late adolescence or early adult life. Its onset is insidious, the patient not experiencing its presence until a fairly large portion of the hearing ability has been incapacitated. One of the first symptoms is tinnitus which is very annoying. Dizziness may be an early or late symptom, but it is not common. Paracusis is a frequent experience.

Those who have no middle ear inflammation have normal drums and patent Eustachian tubes. At times a pink zone is seen through the drum in the region of the promontory.

The classical findings are raising of the lower tone limit, prolongation of bone conduction, negative Rin  , a history of heredity, and abnormalities in the blood chemistry figures.

This entire picture may not be present, and when one or more of the findings are absent the diagnosis may be in doubt. This is particularly so in the incipient cases.

The purpose of this report is:

1. To call attention of otologists to the concomittant presence of contraction of the visual fields in cases of progressive deafness

2. To stimulate others to make examinations of the visual fields in cases of deafness of obscure origin so that by an increase in the number examined and reported, its value as a diagnostic aid may be properly evaluated.

The histories in this report include five cases of progressive deafness and five of other forms of deafness. In addition, eight other cases were examined, the histories of which are not reported. They include two cases of hay fever with no history of deafness; one case of chronic purulent otitis; one case of nerve deafness following acute purulent otitis media and four other cases that were apparently well. All of these had normal visual fields for form and color.

Since December 9, 1927, ten cases of supposed otosclerosis or constitutional deafness were carefully studied; seven of these had contracted visual fields, the remaining three had normal fields.

Drury (Otosclerosis; *Annals of Otology, Rhinology and Laryngology*, vol. xxxv, No. 3, p. 651) reports two cases that were exhaustively studied. Included in his observations were the visual fields. He found in one, contraction of the fields for form and color and an evidence of previous inflammatory condition of the nerve heads; in the other, contracted form and color fields, enlarged blind spots and disc changes, suggestive of previous inflammatory changes.

In an earlier portion of his article Dr. Drury says: "In a study of the connection of otosclerosis with disturbed function of the endocrine system covering a period of two years and involving careful observation and study of a series of over a hundred cases, etc."

From this it is fair to presume that the two cases he reported in the paper in question were the only ones in which the visual fields were taken. For if such an examination had been undertaken on others, he would have been impressed with its presence even though it did not occur with the regularity that is found here.

We know that contraction of visual fields does not occur in all cases of progressive deafness. If it is encountered in a fair proportion of cases, it may have a value in classifying cases that come within the category of progressive deafness into sub-groups. This, in turn, may help us to evolve a more comprehensive conception of its pathological physiology.

PROCEEDINGS OF ACADEMY MEETINGS

STATED MEETINGS

Thursday Evening, May 3, at 8:30 o'clock

- I. EXECUTIVE SESSION
Election of Fellows
- II. PAPER OF THE EVENING
The Future of Surgery, Walton Martin

SPECIAL MEETING OF THE ACADEMY

Wednesday Evening, May 9, at 8:30 o'clock

Under the auspices of the Committee on Public Health Relations

ORDER

OUTDOOR CLEANLINESS AND STREET CONDITIONS

1. Introductory remarks, Samuel W. Lambert, President, The New York Academy of Medicine
2. The view-point of the physician and citizen, B. Sachs, Chairman, Subcommittee on Street Conditions
3. The public's interest in a clean city, John H. Finley, LL.D.
4. Outdoor housekeeping, Mrs. F. I. Vernon Griffith, N. Y. Federation of Women's Clubs
5. Dust and respiratory disease, Harlow Brooks
6. Dust and dirt as a source of serious eye ailments, Walter E. Lambert
7. The street cleaning problem from the engineer's point of view, George A. Soper, Ph.D.

Thursday Evening, May 17, at 8:30 o'clock

Program presented in cooperation with the Section of Medicine

ORDER

- I. EXECUTIVE SESSION
Election of Fellows
- II. PAPERS OF THE EVENING
 - a. The relation of focal infection to chronic arthritis, Russell L. Cecil
 - b. The progress of specific therapy in pneumococcus pneumonia, Horace S. BaldwinDiscussion, R. Garfield Snyder
- III. EXECUTIVE SESSION, SECTION OF MEDICINE
 - a. Report of nomination committee
 - b. Election of officersElection of Officers: For Chairman—Ralph H. Boots; for Secretary—James Ralph Scott

SECTION MEETINGS

SECTION OF DERMATOLOGY AND SYPHILIS

Tuesday Evening, May 1, at 8:30 o'clock

ORDER

- I. PRESENTATION OF PATIENTS
 - a. Cases from the Good Samaritan Dispensary, Department of Dermatology and Syphilology, B. Lapowski, Abraham Walzer
 - b. Cases from the Cornell Skin Clinic, Service of Hans J. Schwartz
 - c. Miscellaneous cases
- II. DISCUSSION
- III. EXECUTIVE SESSION

Election of Officers: For Chairman—Isadore Rosen; for Secretary—Ray H. Rulison

SECTION OF SURGERY

Friday Evening, May 4, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. PRESENTATION OF CASES
 - a. A large twisted teratoma in a child four years old, simulating acute appendicitis, Martin J. Loeb
 - b. Internal fixation of fractures by means of fascia lata sutures, 2 cases, Russell H. Patterson
 - c. Inversion of tumor of Meckel's diverticulum in an ileocecal intussusception, H. B. Eisberg
- III. PAPERS OF THE EVENING
 - a. Painful abdominal scars (with neuromata), Frederic W. Bancroft
 - b. Surgical pathology of goitre. A comparison with the clinical phenomena in 173 cases. Lantern slides, Paul W. Aschner, Leo Edelman
- IV. GENERAL DISCUSSION
- V. EXECUTIVE SESSION

Election of Officers: For Chairman—Edward D. Truesdell; for Secretary—William Crawford White

SECTION OF NEUROLOGY AND PSYCHIATRY

Tuesday Evening, May 8, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. CASE REPORT

Report of a case illustrating the early diagnostic significance of the encephalogram, E. D. Friedman

III. PAPERS OF THE EVENING

- a. The surgical treatment of glossopharyngeal neuralgia with remarks on the distribution of the glossopharyngeal nerve, Byron Stookey
- b. Unusual infections of the central nervous system, Josephine B. Neal

IV. EXECUTIVE SESSION

Election of Officers: For Chairman—Junius W. Stephenson; for Secretary—*James H. Huddleson, Moses Keschner.

*Withdrawn.

SECTION OF PEDIATRICS

Thursday Evening, May 10, at 8:00 o'clock

(promptly)

CLINICAL MEETING

I. PRESENTATION OF CASES

II. EXECUTIVE SESSION

Election of Officers: For Chairman—Stafford McLean; for Secretary—Frank Elmer Johnson

SECTION OF OTOTOLOGY

Friday Evening, May 11, at 8:30 o'clock

ORDER

I. READING OF THE MINUTES

II. PRESENTATION OF CASES

- a. Unusual case of chronic mastoiditis, John Horn
- b. Short reports of five interesting cases of acute mastoiditis, Clarence H. Smith

III. PAPER OF THE EVENING

The finding of contraction of the visual field in progressive deafness, with report of cases, Mark J. Gottlieb

Discussed by Sigmund A. Agatston

IV. GENERAL DISCUSSION

V. EXECUTIVE SESSION

Election of Officers: For Chairman—Clarence H. Smith; for Secretary—James Garfield Dwyer

SECTION OF GENITO-URINARY SURGERY

Wednesday Evening, May 16, at 8:30 o'clock

ORDER

I. PRESENTATION OF CASES

By Urological Staff of Bellevue Hospital

- a. Brief resumé of four cases of bone tumors with associated renal symptoms (lantern slides), G. A. Cashman (by invitation)

- b. 1. Transplantation of ureters into the bowel (2 cases)
2. Leukoplacia in a diverticulum of the bladder (lantern slides),
A. R. Stevens
- c. Electric excision of prostatic bar; recent observations (lantern slides), C. W. Collings
- d. Cases of calculi of the urethra, M. S. Rohde
- e. Spinal anaesthesia in kidney and ureteral operations, H. S. Jeck
- f. Renal calculi, (a) bilateral, (b) in an infected hydronephrotic segment of a horse-shoe kidney (lantern slides), J. J. Valentine
- g. Renal pelvis obstruction due to aberrant vessels (lantern slides),
W. H. McNeil, Jr.
- h. Ureteral obstruction in children (lantern slides), M. F. Campbell

II. EXECUTIVE SESSION

Election of Officers: For Chairman—J. Sturdivant Read; for Secretary—Archie L. Dean, Jr.

SECTION OF ORTHOPEDIC SURGERY

Friday Evening, May 18, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. DEMONSTRATION
X-ray films illustrating the effect of radium poisoning on joints, Robert E. Humphries
- III. PAPERS OF THE EVENING
 - a. Vertebral variations, Theodore A. Willis, Cleveland (by invitation)
Discussion by Russell A. Hibbs, Samuel Kleinberg
 - b. A report on the treatment of hip joint disease at the State Orthopedic Hospital for Children, John J. Nutt
- IV. EXECUTIVE SESSION
Election of Officers: For Chairman—Elmer P. Weigel; for Secretary—Armitage Whitman

SECTION OF OPHTHALMOLOGY

Monday Evening, May 21, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. CLINICAL CASES
 - a. Multiple dermoids of the limbus, John H. Dunnington
 - b. Essential atrophy of the iris, Sol Slomka (by invitation)
 - c. Kruckenberg's Spindle, Benjamin Friedman (by invitation)
 - d. Sclerosis of circle of Willis with simple optic nerve atrophy, Harry A. Goalwin (by invitation)

III. Demonstration of ophthalmological x-rays, George S. Dixon

IV. PAPER OF THE EVENING

Ocular involvement in sinus diseases, Edgar S. Thomson

Discussion, J. E. Mackenty, E. Ross Faulkner, John M. Wheeler

V. EXECUTIVE SESSION

Election of Officers: For Chairman—Bernard Samuels; for Secretary—
Thomas H. Johnson

SECTION OF OBSTETRICS AND GYNECOLOGY

Tuesday Evening, May 22, at 8:30 o'clock

ORDER

I. READING OF THE MINUTES

II. PRESENTATION OF INSTRUMENTS

a. Further simplifications of tubal insufflation, Adolph Jacoby

b. A new instrument for coagulation diathermy of the cervix and a
method of dosage, Frank M. Ende

Discussion by Edward W. Pinkham

III. PAPERS OF THE EVENING

a. A clinical study of acute pelvic infections seen at Bellevue Hos-
pital, Frederick C. Holden

b. Puerperal morbidity and mortality, P. Brooke Bland, Philadelphia
(by invitation)

IV. GENERAL DISCUSSION

V. EXECUTIVE SESSION

a. Report of nomination committee

b. Election of officers

SECTION OF LARYNGOLOGY AND RHINOLOGY

Wednesday Evening, May 23, at 8:30 o'clock

ORDER

I. READING OF THE MINUTES

II. CASE REPORT

Nasal polypi in an 8 year old child, Alfred Michaelis

III. PRESENTATION

Tamponing of the nose, John Horn

IV. PAPER OF THE EVENING

Pathology and differential diagnosis of diseases of the maxillary sinus
(lantern slides), G. W. Mackenzie, Philadelphia (by invitation)

Discussion, Duncan Macpherson, Joseph H. Abraham, Andrew A. Egg-
ston, E. Ross Faulkner, Frederick M. Law

V. EXECUTIVE SESSION

Election of Officers: For Chairman—Westley M. Hunt, David H.
Jones; for Secretary—Edward Frankel, Jr.

NOTES

ACADEMY COLLECTION OF PORTRAITS

The Academy has a collection of portraits of all its former presidents and a number of prominent physicians. It is desirous of having portraits of artistic merit of distinguished members of the medical profession. Portraits of physicians of unusual artistic value are also sought. The limitations of space in the building do not permit the permanent hanging of every portrait in the Academy's collections. Portraits should be usually not larger than 45" x 34" or smaller than 32" x 24", which are the most suitable size for hanging. Frames should be about 4" in width.

The Academy has recently acquired by donation, portraits of the late Dr. Stephen Smith and Dr. William H. Park, a Vice-president of the Academy.

FELLOWS ELECTED MAY 3, 1928

Reuel Allen Benson	115 East 61st Street
George Ernest Binkley	449 Park Avenue
Charles Winfield Buvinger.....	50 Washington St., East Orange, N. J.
Samuel Allison Cosgrove.....	254 Union Street, Jersey City, N. J.
Joseph B. D'Oronzio	117 East 39th Street
A. Milton Goldman	121 East 60th Street
Charles Goldman.....	1501 Union Street, Brooklyn
Herman Horn	103 East 15th Street
Lee Rice Pierce	17 East 38th Street
William Rosenson	142 West 87th Street
William F. C. Steinbugler	815 Park Avenue
Abraham Tow	215 West 75th Street

FELLOWS ELECTED MAY 17, 1928

Sol Biloon	2021 Grand Concourse
Henry W. Cattell	Cookstown, New Jersey
Samuel Adams Cohen	130 West 86th Street
Hanibal DeBellis	316 West 18th Street
Joseph P. Eidson	114 East 40th Street
William Elser	New York Hospital

John Norris Evans.....	23 Schermerhorn Street, Brooklyn
Joseph Stanton Hory	391 East 149th Street
Harvey B. Matthews.....	643 St. Mark's Avenue, Brooklyn
Andrew Harp Montgomery	114 East 62nd Street
Vincent Anthony Nardiello	233 Lafayette Street
Elliott Norton	101 East 54th Street
Alfred Owre	302 East 35th Street
Charles A. Perilli	105 West 11th Street
Thomas F. Reilly.....	20 Maple Street, Springfield, Mass.
Maurice N. Richter	114 East 66th Street
Lewis Byrne Robinson	40 East 83rd Street
Morton Ryder.....	1 Grandview Avenue, Rye, N. Y.
Sidney P. Schwartz	130 East 94th Street
Benjamin White Seaman.....	Hempstead, New York
Gregory Shwartzman	664 West 163rd Street
Jesse Feiring Williams	501 West 120th Street

AND FOR ASSOCIATE FELLOWSHIP

William J. Gies, Ph.D.....	632 West 168th Street
Margaret Morris Hoskins, Ph.D.....	209 East 23rd Street
Gustave Joseph Noback, Ph.D.....	338 East 26th Street
Bissell Barbour Palmer, Jr., D.D.S.....	667 Madison Avenue
Bertram Garner Smith, Ph.D.....	338 East 26th Street
John C. Torrey, Ph.D.....	414 East 26th Street

RECENT ACCESSIONS TO THE LIBRARY

- Academia nacional de medicina de Buenos Aires. Libro de oro ofrecido al
Prof. Dr. Domingo Cabred. 15. de Diciembre de 1927.
Buenos Aires, Buffarini, 1928. 596 p.
- Alexander, J. Thought-control in everyday life.
N. Y., Funk, 1928. 261 p.
- Bacon, R. The opus majus of . . .
Phila., Univ. of Penn. pr., 1928. 2 vols.
- Baronaki, E. Les néoplasmes.
Paris, Maloine. 1927. 135 p.
- Berman, L. The glands regulating personality.
2. ed. N. Y., Macmillan, 1928. 341 p.
- Beuttner, O. Technik der peritonealen Wundbehandlung des weiblichen Beckens.
Zürich, Fussli, 1918. 488 p.
- Bolognesi, G. & Chiurco, G. A. Le micosi chirurgiche.
Siena, Libr. ed. Senese, 1927. 3 vols.
- Budge, Sir E. A. W. The Divine origin of the craft of the herbalist.
Lond., Soc. herbalists, 1928. 96 p.
- Burton-Opitz, R. An elementary manual of physiology.
3. ed. Phila., Saunders, 1928. 419 p.
- Castaldi, L. Accrescimento corporeo e costituzioni dell'uomo.
Firenze, Niccolai, 1928. 350 p.
- Chiray, M. & Pavel, I. La vésicule biliaire.
Paris, Masson, 1927. 568 p.
- Claremont, C. A. Intelligence and mental growth.
Lond., Kegan Paul, 1927. 138 p.
- Cova, F. Atlas thorascopicon.
Mediolanum, Sperling, 1928. 50 plates.
- Curschmann, H. Endokrine Krankheiten.
Dresden, Steinkopff, 1927. 151 p.
- Daniélopou, D. L'angine de poitrine et l'angine abdominale.
Paris, Masson, 1927. 443 p.
- Dardel, G. De la douleur en chirurgie.
Berne, Franke, 1926. 14 l.
- Dombray, P. Diagnostic biologique de la gonococcie.
Paris, Maloine, 1927. 171 p.
- Ferrier, J. K. Crooks & crime.
Lond., Seeley, 1928. 314 p.
- Garbini, G. Tavole sinottiche di oto-rino-laringoiatria.
Trento, Monauni, 1927. 75 p.
- Goepp, R. M. Dental state board questions and answers.
4. ed. Phila., Saunders, 1928. 463 p.
- Goodman, H. The basis of light therapy.
2. ed. N. Y., Med. lay press, 1928. 212 p.

- Gould's medical dictionary. Ed. by R. J. E. Scott.
2. ed. Phila., Blakiston, 1928. 1507 p.
- Greaves, J. E. & Greaves, E. O. Elementary bacteriology.
Phila., Saunders, 1928. 506 p.
- Green's manual of pathology and morbid anatomy.
14. ed. Lond., Baillière, 1928. 650 p.
- Hall, P. Ultra-violet rays in the treatment and cure of disease.
3. ed. Lond., Heinemann, 1927. 236 p.
- Hallé, N. Eléments de philosophie médicale.
Paris, Rivière, 1926. 432 p.
- Havet, J. Manuel pratique d'histologie et d'embryologie.
Louvain, Uystpruyst, 1926. 508 p.
- Hecht, A. F. Die akute Mittelohrentzündung als Kinderkrankheit.
Wien, Springer, 1928. 126 p.
- Hirszfeld, L. Konstitutionsserologie und Blutgruppenforschung.
Berlin, Springer, 1928. 235 p.
- Hollós, J. Tuberculous intoxications.
Edinb., Livingstone, 1928. 132 p.
- Jordan, E. O. A text-book of general bacteriology.
9. ed. Phila., Saunders, 1928. 778 p.
- Kanner, L. Folklore of the teeth.
N. Y., Macmillan, 1928. 316 p.
- Kihn, B. Die Behandlung der quartären Syphilis mit akuten Infektionen.
München, Bergmann, 1927. 339 p.
- Laboratoriumsmethoden der Wiener Kliniken. Hrsg. von H. K. Barrenscheen & R. Willheim.
Leip., Deuticke, 1928. 800 p.
- Leggett, B. J. The theory and practice of radiology.
Lond., Chapman, 1928. 3 vols.
- Leriche, J. Les glandes endocrines et les cancers.
Paris, Maloine, 1927. 51 p.
- McGowan, P. J. On Rous, leucotic & allied tumors in the fowl.
Lond., Lewis, 1928. 99 p.
- Mainoldi, P. Diagnostica radiologica dei tumori addominali.
Bologna, Cappeli, 1928. 46 p.
- Marshall, J. F. Principles and practice of mosquito control.
Hayling Island, Hampshire, Brit. mosquito control inst., 1927. 39 p.
- Negro, F. Malattia di Parkinson e sindromi Parkinsoniane.
Torino, Lattes, 1928. 293 p.
- Netherlands. Pharmacopoea Nederlandica.
5. ed. 's Gravenhage. Allg. Landdruk, 1926. 675 p.
- Norman, H. J. Mental disorders.
Edinb., Livingstone, 1928. 463 p.
- Ochuell, H. Die Magengeschwürskrankheit.
Dresden, Steinkopff, 1927. 82 p.
- Ostwald, W. Lebenslinien. 1905-1927.
Berlin, Klasing, 1927. Pt. 3.

- Pagniello, A. I grandi pilastri della guerra.
Torino, Bocca, 1928. 251 p.
- Pardee, H. E. B. Clinical aspects of the electrocardiogram.
2. ed. N. Y., Hoeber, 1928. 242 p.
- Pelouze, P. S. Gonococcal urethritis in the male.
Phila., Saunders, 1928. 357 p.
- Pende, N. Constitutional inadequacies.
Phila., Lea, 1928. 270 p.
- Pringsheim, P. Fluorescenz und Phosphorescenz.
3. aufl. Berlin, Springer, 1928. 357 p.
- Quintero, J. T. Technique orthodontique.
Paris, Baillière, 1928. 416 p.
- Radiologie clinique du tube digestif. Pub. sous la direction de MM. P. Duval, J. C. Roux, H. Bécère.
Paris, Masson, 1927. 2 vols.
- Roth, I. R. Cardiac arrhythmias.
N. Y., Hoeber, 1928. 210 p.
- Santé, L. R. Lobar pneumonia.
N. Y., Hoeber, 1927. 137 p.
- Schreiber, E. Ein Tag am Operationsstuhl. Arbeitsmethoden. . . der . . . Zahnheilkunde.
Berlin, Meusser, 1928. 91 p.
- Skelett-tafeln: hrsg. von L. Gerlach.
12. aufl. Erlangen, Palin, 1927. 44 pl.
- Sparacio, B. La glandola tiroide in dermatologia.
Bologna, Cappelli, 1928. 45 p.
- Stevens, A. A. A manual of the practice of medicine.
12. ed. Phila., Saunders, 1928. 657 p.
- Taylor, S. T. The diary of a medical student during the Mid-Victorian period. 1860-1864.
Norwich, Jerrold, 1927. 211 p.
- Terrien, F. Chirurgie de l'oeil et de ses annexes.
3. éd. Paris, Masson, 1927. 646 p.
- Thurston, W. R. Thurston's philosophy of marriage.
N. Y., Tiffany pr., 1927. 32 p.
- Tillmans, J. Lehrbuch der Lebensmittelchemie.
München, Bergmann, 1927. 387 p.
- Transactions of the American climatological and clinical association. 1926.
- Transactions of the American gynecological society. 1927.
- Transactions of the American hospital association. 1927.
- Transactions of the American ophthalmological society. 1927.
- Transactions of the American surgical association. 1927.
- Ueber die katalytischen Wirkungen der lebendigen Substanz. Hrsg. von O. Warburg.
Berlin, Springer, 1928. 528 p.

- Van Gehuchten, A. *Les maladies nerveuses.*
Louvain, Uystpruyst, 1926. 694 p.
- Watson, A. McL. *A handbook of histology.*
Edinb., Livingstone, 1928. 207 p.
- Weinberg, M. & Ginsbourg, B. *Données récentes sur les microbes anaérobies.*
Paris, Masson, 1927. 291 p.
- Wheeler, Sir Wm. I. de C. *Selected papers on injuries and diseases of bone.*
Lond., Baillière, 1928. 148 p.
- Wingfield, A. H. *Twins and orphans.*
Lond., Dent, 1928. 127 p.
-

DEATHS OF FELLOWS

JOHN S. BILLINGS, A.B., M.D., 1 East 51st Street, New York City; graduated in medicine from the University of Pennsylvania, 1892; elected a Fellow of the Academy February 5, 1903; died April 27, 1928.

HERBERT LOUIS CELLER, A.B., M.D., 31 West 86th Street, New York City; graduated in medicine from the College of Physicians and Surgeons, New York City, 1900; elected a Fellow of the Academy January 7, 1909; died April 26, 1928. Dr. Celler was a Fellow of the American Medical Association, and a member of the Pathological Society. He was also Associate Physician at Mt. Sinai Hospital.

HERMANN GUSTAV KLOTZ, M.D., 300 West 12th Street, New York City; graduated in medicine from the University of Leipzig, Germany, 1868; elected a Fellow of the Academy February 4, 1892; died May 8, 1928. Dr. Klotz was a member of the American Dermatological Society and the New York Dermatological Society. He was also a member of the Alumni Association of Lenox Hill Hospital and Consulting Dermatologist to Lenox Hill Hospital.

JOHN WOODMAN, M.D., 56 West 56th Street, New York City; graduate in medicine from the College of Physicians and Surgeons, New York City, 1883; elected a Fellow of the Academy December 3, 1908; died May 14, 1928. Dr. Woodman was a member of the American Medical Association.

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VOL. IV.

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No. 7

PAPERS DELIVERED AT STATED MEETINGS CONCERNING CERTAIN OCULAR INTERPRETA- TIONS OF CARDIOVASCULAR, RENAL, METABOLIC AND INTRACRANIAL DISORDERS

(ABSTRACT)

G. E. DE SCHWEINITZ
Philadelphia

Although Charles Babbage, in 1847, devised an instrument for the examination of the interior of the eye, he failed to record an account of it, and hence the invention and introduction of the ophthalmoscope are universally ascribed to von Helmholtz, whose description of his discovery was published seventy-six years ago.

This discovery gave ophthalmology its place among the exact sciences; it opened up a new field of research—medical ophthalmoscopy.

The ophthalmoscope of our day, greatly improved in its mechanism, with electric light as its source of illumination, takes high rank among the instruments of precision whereby investigation and diagnosis of bodily ailments are greatly facilitated.

It is the purpose of the present lecture to endeavor to demonstrate in description and illustration some of its uses in general medical practice.

The chief vascular supply of the retina is derived from the internal carotid through the ophthalmic artery and one of its branches, the central retinal artery.

The retinal arteries do not anastomose with each other; they are end-arteries; they belong, in general terms, to the internal carotid system, and therefore, in certain circumstances, participate in, or are associated with, lesions of the other vessels of this system, that is, those in the brain cortex and basal ganglia.

Arteriosclerosis. The first important association, just referred to, concerns itself with the retinal manifestations of arteriosclerosis, which may be divided into: (a) Those which are suspicious, *i.e.*, justify suspicion of coming events; (b) those which are strongly suggestive, and (c) those which are definite and diagnostic.

The four chief manifestations are alteration of the normal relation of an artery where it crosses a vein—indentation, that is arteriovenous compression; irregularity of the lumen of the vessels; silver or copper wire arteries; tortuosity of the arteries; retinal hemorrhages.

But the ophthalmoscope can do more than simply detect retinal angiosclerosis; it can reveal the variety which in turn indicates the causative factor with considerable exactness. Four classes can be differentiated: (1) *Senile*, (2) *primary*, (3) *consecutive*, and (4) *secondary*. H. P. Wagener's excellent classification is followed.

In the *senile* type there are reduction of the apparent caliber of arteries and veins, but with regular lumina, no arteriovenous compression, but pallor of the disc, sclerosis of the choroidal vessels, and often spots of guttate choroiditis. This condition is nothing more than one which naturally obtains in old age; it may be regarded as a pathological norm. In such an eyeground, naturally, the graver forms of angiosclerosis may develop.

In *primary arteriosclerosis*, that is, endovasculitis, there are exaggeration of the retinal arterial reflex and beading, irregularities in the caliber of the retinal arteries, arteriovenous compression, tortuous terminal arterioles, areas of obliteration of arteries, new vessel formation, perivasculitis, and dusky congestion of the disc.

In *consecutive arteriosclerosis, due to general vascular hypertension*, there are exaggerated retinal arterial reflexes, generalized reduction in the caliber of the retinal arteries, irregularities of their lumina, venous engorgement and *straight arteriovenous compression*, i.e., the course of the vein is not altered, but beading of the vessels, new vessels, perivasculitis, and spots of arterial obliteration are absent.

Implanted upon a fundus of this character there may be scattered white patches, hemorrhages, constituting the type named by Benedict "*retinitis of hypertension plus nephritis*," and if the hypertension is malignant, hemorrhages and edema are marked.

Another type, which is engrafted on retinal vascular disease, is *arteriosclerotic retinitis*, especially described by Foster Moore, which should be differentiated from renal retinitis, as shall presently appear, although albumin may be present in the urine. In a fair percentage of the cases it is unilateral. It is characterized by numerous white spots, sometimes collected or fan-shaped, and hemorrhages; the other signs previously named are present.

Recently Wagener has elaborately described the ophthalmoscopic appearances of the retinitis of malignant hypertension which progresses through several stages. Mainly these features are present: Disc-edema, peripapillary edema, hemorrhagic areas, sometimes cotton-wool patches, sclerosis of retinal arterioles. It can be distinguished from other types of vascular retinitis, and is superimposed on pre-existing sclerosis of retinal arterioles. The outstanding pathologic features are marked hypertension, diffuse arteriosclerosis and sclerosis of arterioles and capillaries. The nephritis, never primary, is secondary to arterial disease.

In the *secondary arteriosclerotic group* are included those vascular changes seen after subsidence of renal retinitis and other varieties of retinitis and neuroretinitis and of papilledema.

The early signs of retinal angiosclerosis as described often lead to the discovery of primary arteriosclerosis and vascular hypertension, and may antedate the usual clinical signs—prolongation of the second sound of the heart, the record of the sphygmomanometer, etc., etc.

Excluding senile retinal angiosclerosis, the various types of this disease constitute a fair guide as to the condition of the arteries of the brain, and considerable investigation has developed the fact that in at least 70 per cent. of the cases where retinal angiosclerosis, including arteriosclerotic retinitis, is present, there is a coexisting disease of the vessels of the brain.

In general terms it may be stated that where disease of the retinal arteries is present, as described, there is also disease of the cerebral arteries, but there may be advanced sclerosis of the cerebral arteries and no retinal angiosclerosis.

These patients usually die of vascular cerebral disease, or cerebral hemorrhage or thrombosis; their lives may be prolonged by an early discovery of the retinal changes, and proper treatment.

The next subject for pictorial demonstration are the eye-grounds which indicate renal disease, which are usually denominated albuminuric retinitis—a poor term, for which renal retinitis should be substituted.

Renal retinitis is most common in association with chronic interstitial or glomerular nephritis, and is also seen with parenchymatous nephritis and secondary contracted kidney.

In my experience, in hospital work fully 30 per cent. of the patients with chronic Bright's disease have had various forms of retinitis, but if these statistics should include not only typical cases, but also comparatively insignificant lesions, the percentage would be higher.

There is a general impression among physicians that the retinal indications of nephritis are so definite that they are

well-nigh typical or pathognomonic. This is, however, not always the case. The chief signs are: Edema of the disc, its edges surrounded by a whitish bank of edema, the so-called snow-bank appearance; engorged veins, hemorrhages and a variety of white spots—cotton-wool patches, and fine white spots of degenerated varicose nerve fibers—and dots which coalesce in the macula and form the so-called "star figure." When these, which individually may occur in many conditions, are grouped, the fundus picture is strongly suggestive of renal disease. Marked retinal angiosclerosis may be evident. But there are many types which are not at all like the one described, and yet indicate nephritis. The lesions of the retina are partly due to vascular changes and partly to a toxic influence.

It is an interesting fact that renal retinitis is very often the first definite indication of nephritis, and is discovered by the ophthalmologist, the patient having consulted him entirely unconscious of the fact that he is the subject of Bright's disease.

The presence of renal retinitis renders the vital prognosis most unfavorable, and it is usually stated that patients rarely live longer than two years after its detection. I am sure these figures are too pessimistic, and often with care and proper treatment associated with the advantage of early discovery, the patient's life can be much prolonged.

I am also sure that the various types or manifestations of renal retinitis should be more carefully ophthalmoscopically analyzed. This is work requiring very special knowledge. The prognosis as to life is more evil when cotton-wool patches predominate, and when disc-edema (choked disc) is the only or most conspicuous fundus lesion.

The *retinitis of pregnancy*, usually denominated albuminuric retinitis of pregnancy, occurs most frequently in primiparae, usually in the second half of pregnancy, exceptionally at an earlier period; it is partly due to an associated nephritis, depending on fatty changes in the kidney

epithelium, and partly to toxemic products. The ocular prognosis is much better than that of renal retinitis, and the lesions may disappear with the termination of pregnancy, but if the lesions arise during the first six months of pregnancy, the labor ought to be artificially induced.

The *retinitis of diabetes* occurs in a number of forms. I exhibit two varieties—the one an exudative type with massed whitish exudate in the central area of the retina, hemorrhages and decided vascular sclerosis, and the other with punctate white spots and small hemorrhages, clot or bullet-like; this is the more characteristic type. The white exudates are solid looking (not cotton-wool) and somewhat soapy in appearance.

This retinitis practically never occurs prior to the thirty-fifth or fortieth year of life; often coma, hemiplegia, gangrene, etc., are present. It is quite certain that this retinitis is not due alone to perverted metabolism, diacetic acid, acetone nor hyperglycemia. If it were, young patients would acquire retinitis, which they never do. In many instances, if not in all, angiosclerosis is a concomitant condition and has its etiologic significance. The prognosis is not so evil as that which pertains to renal retinitis.

Tubercles in the Choroid—small yellowish-white spots are usually, although not always, associated with tuberculous meningitis. The spots may be scattered or arise along the vessels; they are usually surrounded by a delicate rose-colored ring. There may be an association of optic neuritis and choroidal tubercle.

Retinal tuberculosis begins with the white formations along the retinal vessels—later perivascularitis and hemorrhages appear, and still later, it may be, proliferating retinitis.

Ophthalmoscopic examination is often of value to decide between a meningitis, for instance, of typhoid fever, and one due to t.b. meningeal involvement. Tubercles in the choroid are usually late in appearance, sometimes just before a fatal illness.

Choked disc (papilledema) is due to increased intracranial pressure which forces the subarachnoid fluid into the intersheath of the optic nerve, causing venous engorgement and lymph stasis.

It is the most important general symptom of conditions of the brain and its meninges, which create this increased pressure—hence tumor of the cerebrum and cerebellum and meninges. It is also caused by many other lesions, but time does not permit their inclusion. Usually the choked disc (papilledema) of increased intracranial tension can be differentiated from optic neuritis (papillitis).

It occurs with all kinds of tumors in all areas of the brain and cortex, basal ganglia and cerebellum (except, perhaps, with pure pontine tumors) and with brain lues. It is present in fully 80 per cent. of tumors of the brain and cerebellum.

Other things being equal, release of increased intracranial pressure by a decompressive trephining is the procedure which promises the best results, that is, prevents blindness from post-papillitic atrophy. It must be done in the early stages to obtain this result. Occasionally repeated lumbar punctures, only a small amount of fluid being withdrawn at each operation, cause a subsidence of choked disc.

All patients with skull injuries should be carefully examined ophthalmoscopically. If advancing papilledema is discovered, it is an indication for operative interference for the purpose of evacuating an epi- or subdural hemorrhage.

The various fundus lesions were portrayed by means of water colors, for the most part painted by the late Miss Margaretta Washington.

THE PRESENT STATUS OF PHYSICAL THERAPY

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During the last few years the medical profession has begun to realize the value of physical measures of treatment.

The impetus which such therapeutics received from its use in the Army, Navy, Public Health and Veterans' Bureau Hospitals, has been increased by civilian agencies.

"The recognition of physical therapy as a legitimate and important branch of medicine by the American Medical Association, and the appointment by it of a Council on Physical Therapy, undoubtedly marked the dawn of a new era in this art."

The Council, composed of clinicians, pathologists, physiologists, biophysicists and physicists, is earnestly attacking the manifold problems which this subject presents. To quote: "The Council on Physical Therapy of the American Medical Association will endeavor to point out to the medical profession the advantages and disadvantages of physical therapy, so that its abuses may be reduced to a minimum and its scientific possibilities may be appreciated." To this end many laboratory and clinical investigations are being made under authoritative auspices. Basic papers on the subdivision of physical therapy—that is, massage, muscle reëducation, electrotherapy, hydrotherapy and mechanotherapy—either have been, or shortly will be, published in the *Journal of the American Medical Association*.

The therapeutic claims, with supporting scientific evidence submitted by the various manufacturers of electrotherapeutic apparatus, are critically examined by the Council. If inconclusive, further evidence is required, or if the subject is of sufficient basic importance it is referred to some medical center with the request that it be submitted to scientific, clinical and laboratory tests. Soon the Council hopes to publish a tentative list of approved

apparatus of those firms whose products are not only scientifically designed and will deliver what they are claimed to, but also whose literature is free from the fairy tales of pseudo-science and impossible biology. In short, the Council on Physical Therapy hopes to accomplish for this subject the same "de-bunking" results which the Council on Pharmacy has consummated for the pharmaceutical manufacturers and those specializing in miraculous patent medicines.

Soon the medical schools will be requested to make such revision of their curricula that adequate undergraduate instruction shall be given in physical therapy. Several plans will be submitted for their consideration. The problems of postgraduate instruction will also be stressed and several solutions will be suggested, such as standardized courses either directly in the medical schools or as university extension courses. Systematic courses under the auspices of State, County, or local societies will be urged and a list of speakers qualified to lecture on certain subjects may be offered. The liberal inclusion of papers on physical therapy in medical conventions will be advised.

When the medical profession at large realizes that the proper application of physical measures of treatment is an effective answer to the challenge of the cults the demand for further instruction will be insistent.

That such instruction is necessary is best shown by the rapidity with which some alleged physiotherapists have been made. Not long ago a one or two weeks' course under commercial auspices was sufficient; now, an enterprising manufacturer advertises that the possession of his piece of electrical apparatus and three hours' study of his compendium of electrotherapy will make its proud possessor a full-fledged physiotherapist (electrotherapeutic branch) competent to cure the ills of man or beast.

The Council on Physical Therapy recently sent questionnaires to seventy-one medical colleges; forty-one reported some instruction in physical therapy; nineteen re-

ported no instruction; two were considering the introduction of such courses; one institution reported that it was organizing a course. A month later three schools reported that courses were being organized, and still three others that since the questionnaire, departments had been formed.

The complaint has been made that the Council has made slow progress and that its work has consisted mainly of promises of what it intends to do. It will very soon be evident, however, that such is not the case. Medicine for centuries was in its swaddling clothes surrounded by the incantations of the medicine man, the soothsayer and the oracle. Even now if we listen to a small but vociferous group we might conclude that medicine had reverted to dream books and interpreters thereof. Surgery also has slowly emerged from the hands of the barber. Much of the mysticism which enshrouded physical therapy and which consequently made it a choice morsel for the quack and the unscrupulous physician has been removed. It is now recognized that one or more of the following properties are inherent in all physical measures of treatment—namely, chemical, thermal, mechanical and psychical. The latter, psychical, has been considered by many to be its only effect. It is true that all therapeutics has greater or less psychical value. It may seem to loom large in physical therapy, but constantly increasing laboratory studies show that relatively it has little more than that which exists in medicine and surgery, and that it is infinitely less than that which exists in much of the modern neurology. Such an attribute is a valuable asset and its possession should not be held up as a reproach against its possessor. In the *Journal of the American Medical Association* it was stated that among the various laboratory investigations the following were significant:

- “1. The influence of ultra-violet rays on the blood chemistry, whereby the calcium and the phosphorus content of the blood were generally augmented.
2. The power of diathermy in suitable cases of non-union or delayed union of bone in hastening the formation of callus.

3. The more rapid disappearance of calcium carbonate in bursitis with calcification by means of the same diathermy.
4. The increase in basal metabolism under autocondensation.
5. The increase in urinary solids, hitherto deficient, by autocondensation, and at times by the sinusoidal current.
6. The deposition of calcium salts in rickets.
7. The influence of actinic energy not only on the hemoglobin content of the blood but also on the number of red cells, and not infrequently on their differential count.
8. The increase in the alkali reserve under the administration of radiant heat."

As has been said many times, physical therapy is not a separate cult. It is a part of the bone and sinew of medicine and surgery. It is their adjunct to ensure functional and physical restoration.

In industrial medicine, physical therapy properly used, by shortening the time of disability, results in appreciable economic gain to the patient, to the industry, and to the community at large. The Rehabilitation Clinic in Syracuse, New York, is an example of this. Here, in fifty-one months, four hundred and seventy-four cases have shown a saving of \$163,000 over the evaluation of the state board. Properly applied physical therapy—Aye, there is the rub! In many places, insurance companies have bitterly complained of bills rendered for alleged physical therapy which has not shortened the time of disability and which has greatly augmented the industrial financial loss.

Too often a physician, a possessor of one or two pieces of apparatus, his only knowledge a salesman's say so, boldly holds forth as a specialist in physical therapy. As a warning against this the Council on Physical Therapy has said: "A physician who has installed a diathermy machine or an ultra-violet ray generator can do good in carefully selected cases with one of these methods. He is not, however, fully equipped to render physical therapeutics. As a rule, it is the careful combination of several

physical agencies that gets the best results." This combination of physical measures is the keynote to success. It frequently is not enough to prescribe one or more of the various forms of electrical manifestations and omit from the prescription massage, muscle reëducation, or hydrotherapy. Such treatment is not properly applied physical therapy. Because of this, though it is a short-sighted policy, many insurance companies, and some state industrial boards have fixed fees for physical therapeutic treatment which are too low to cover the actual expense of an adequate treatment. What is the answer? It lies in constituting a preferred class. In some states the medical board has the right, through the authority invested in it, to examine and register persons desiring to practice any limited branch or branches of medicine and surgery, and to establish rules and regulations governing such limited practice. In this way the incompetents would be weeded out and those thus registered as specialists in physical therapy would soon prove that the laborer was worthy of his hire by the more rapid return of the industrially incapacitated to gainful occupations.

In the limited time at my disposal it will be possible to consider in detail only a few of the ramifications of this subject.

The value of electrosurgery in properly selected cases is so well known that discussion of it here would be repetition.

There is, however, one electrical manifestation which is in popular favor, both lay and medical—the ultra-violet ray. This is pregnant with possibilities for good and for evil. The newspaper and periodical write-ups have created an intense public interest. It is natural that the fond parent should desire that his offspring, in the months deficient in ultra-violet radiation, should enjoy Florida sunshine, while attending school in northern climes. Some of the manufacturers of apparatus have been quick to enter this profitable field, and though ostensibly under the

guise of selling or renting apparatus only under a physician's prescription, yet in some instances they have conducted a house to house canvass of likely prospects. Clubs also have been shown the income to be derived by the installation of sun rooms. The bulk of this is not under any adequate medical supervision. If the apparatus sold delivered a spectrum which was analagous to the solar, the risk would be less—though even here untoward results have been observed. The solar ultra-violet rays, the so-called near or vital, are those to which the human organism has been tuned to respond. In the most popular form of ultra-violet irradiation, the mercury vapor arc, the ultra-violet radiation consists of these longer wave lengths plus others much shorter than those to which the body is accustomed. Under such conditions the medical supervision should be careful and constant. Because of untoward results, the French Government recently has placed the use of ultra-violet under the laws of practice of medicine act and only physicians can legally employ it. In some cases a markedly decreased resistance of the hæmapoietic organs ensues. In other cases ultra-violet radiation has acted like a protein shock bringing about a prolonged negative phase. After the ingestion of certain articles of food or hypnotics of the barbital group, sickness may ensue. Hence, under such conditions the sale of ultra-violet apparatus to the laity or clubs should be restricted to that in which the spectrum is limited to that of the solar, that is not lower than 2900 Angström units. It has been claimed that by repeated skin irritation cutaneous cancer may be produced. I have yet to find an authenticated case of this. On the other hand, certain skins markedly susceptible to the sun's rays may develop an intractible chronic eczema.

The reverse of this picture is a brighter story. Take for example tuberculous conditions, as lupus vulgaris, tuberculous of the bones (surgical tuberculosis), tuberculous adenitis, tuberculous peritonitis, tuberculous kidney, and, less successful, intestinal tuberculosis. In these conditions

the results are suprisingly good. *Pulmonary tuberculosis*. Here, ultra-violet rightly used may be a valuable adjunct. Too long an exposure over too great a surface is generally followed by disastrous results.

Probably the Vitamin D evolved from the action of ultra-violet on the cholesterol of the skin accounts in part for the increased calcium and phosphorus content of the blood and it affords at least a plausible explanation for the results obtained in rickets, spasmophilia, and certain deficiency diseases.

Indolent wounds, discharging sinuses and cutaneous ulcers respond at times miraculously. In diseases of the skin the results are variable. Certain types of eczema do well; others poorly; and still others are made worse. *Psoriatic* patches generally disappear but their reappearance may be looked for any time thereafter. *Sycosis, tinea*, and *impetigo contagiosa* respond quickly to this treatment. In *herpes zoster*, if used early, it is almost a specific and apparently there is less likelihood of disagreeable after paresthesias. *Pruritus*, causative factor if found of course removed, is generally relieved. In *acne vulgaris* the results are as a rule excellent though at times it may stimulate a growth of hair on the face. If this phenomenon would occur consistently on areas where it is so often deficient, the manufacturers of ultra-violet apparatus would be obliged to build additions to their factories. In *alopecia areata* there is frequently re-growth of hair. The *Journal of the American Medical Association* has reported a number of cases of *purpura hæmorrhagica* and hæmorrhagic disease of the newborn which have been so markedly benefited by general ultra-violet irradiation as to warrant its employment in such pathology. Ultra-violet seems to be valuable as an adjunct to the modern dietetic treatment of pernicious anemia. At the Boston City Hospital cases seemingly at a standstill have promptly improved when general ultra-violet irradiation was added to the previous treatment. In blood pressure the administration of ultra-violet gives variable results, the tendency being towards

reduction. This may be due in part to dilatation of the cutaneous capillaries.

Recent laboratory studies apparently show:

1. That short exposures to ultra-violet increases the hemoglobin content and number of red cells to a slight extent in normal blood. After cessation of treatment there is a rapid return to normal.
2. That short exposures also have the same effect in cases in which the red blood cells and hemoglobin are lower than normal. They tend to remain normal.
3. That after a single exposure the blood platelet count is increased, successive daily doses increases the count progressively. The immediate effect is a sharp drop followed by a marked rise above normal.
4. That there is an initial drop of the lymphocytes as a constant reaction to all ultra-violet exposure whether in single or successive daily doses. If a massive dose is given a leukopenia of several days' duration results. This is suggestive in view of the tendency towards self-treatment.
5. That if the dose is not too great, ultra-violet wave lengths shorter than 3000 Angström units produce, following the initial drop, an increase in the lymphocytes.
6. That wave lengths shorter than 2750 Angström units have no effect on the polymorphonuclears, while wave lengths between 2750 and 3200 Angström units will produce a sharp rise which attains its maximum in five hours. This increase lasts for several days.

All laboratory and clinical observations show that there is an optimum dose of ultra-violet and that an excessive dose may be harmful. At present there is no exact method of standardizing dosage, though for the average practitioner the lithopone unit of Dr. Janet Clark will be found to be the most satisfactory.

The relative merits of heliotherapy, the carbon arc, and the mercury vapor are still *sub judice*. It is probable that specific indications will be found for each. Factors

foreign to the carbon and mercury arc enter into the use of heliotherapy for here we have the effects of variation of temperature, frequently of altitude, the metabolic whip of the breeze on the naked body, and generally a complete change of environment and dietetic regime.

Diathermy is a close second to the ultra-violet in the professional mind. This form of high frequency electricity has the property, because of internal tissue resistance, of inducing heat within the tissues themselves. The hot water bottle, the electric heating pad, electric light applicator, the hot soak, and the whirlpool bath have a more or less superficial effect due to the limited heat conduction power of the skin. It is true that vaso-dilatation does take place. The blood stream becomes warm to a greater or less degree and in that way may act reflexly through stimulation of the central heat centers, and the blood from the deeper lying structures is determined to the skin, thus producing depletion if there is deep seated engorgement. On the other hand, with diathermy, the skin is less of a factor. Its resistance and that of the tissues in the path of the current causes a deeper seated heat to be generated than by any method with which we are now conversant. A short time ago pretty geometrical figures were drawn showing that given two unequal bases the intersection of diagonal lines drawn from the ends of one base to the other would be the point of greatest heat intensity. This is not strictly true though the point of greatest heat will be nearer the smaller electrode. In living tissue we have another story, for here the circulation of the blood dissipates an appreciable amount of the heat and the varying degrees of resistance of the tissues encountered also play their part. Some experiments seemed to prove that the heat penetration was relatively slight, though far superior to any other method, but more careful and scientific laboratory check-ups with more sensitive apparatus show that in the living subject tissues are heated to considerable depths. In general, diathermy may be used in any condition in which heat will give relief. Its main contraindications are where by dilatation of blood vessels

hemorrhage may ensue or where there is pus without drainage. As its main component is heat, and if proper attention is paid to technic, there is less chance of harming the patient through an ill-advised prescription than there is in the use of ultra-violet or the other subdivisions of physical therapy. In combination with ultra-violet it is useful in certain types of asthma and bronchitis. In subdeltoid bursitis, with or without calcification, added to galvanism, massage and manipulation it ordinarily will afford speedy relief.

Static electricity is an anathema to many, and a Mecca to others. To one who is able to steer a middle course it will be of great service. Too often, though, in the form of the static wave current it is prescribed for conditions in which massage and muscle training would be infinitely better.

Only the pathology commonly met with should be considered in a summary like this. Especial attention should also be paid to any procedure or practice which if persisted in might harm the patient or the fair name of physical therapy.

The promiscuous rental of radium to physicians is an example of the latter. This may be dangerous both to the physician and the patient. A surgeon who would not undertake an unusual operation without infinite attention to detail will without previous experience or taking the time to learn the fundamental principle governing the action of this radio-active substance, fill out a blank giving the site, size and character of the lesion and attempt to follow the instruction of the radium specialist of the company. This specialist, who may not be a physician, will give directions for the treatment of a patient he has never seen, to a man who knows little of the risks, reactions and dangers of such treatment. The result may be good, or it may lead to injurious or disastrous consequences.

Fractures. According to insurance companies' statistics, and a report of a special committee of the American

College of Surgeons, fractures as a rule are rather badly handled. A part of this is frankly bad surgery or poor reduction; but most serious of all is the loss of function after union has taken place. This is generally due to too long immobilization and the non-use of physical measures of treatment. If physical therapy is started early, stiffness and ankylosis are generally prevented. Trophic changes are minimized and the end result is not only bony cure but functional restoration.

Stiff and Painful Knees. This affliction, occurring after middle age, may or may not show any demonstrable pathology. Diathermy and galvanism will generally, if there is no mechanical reason to prevent it, give for many months a symptomatic cure. The pain will be relieved and the range of motion will be greatly increased, even to normal. There are apt to be exacerbations but these in turn yield to a similar treatment.

Pneumonia. Discounting all therapeutic claims made for the use of diathermy in pneumonia the one fact that in the majority of cases pain is relieved and the patient has more sleep, justifies its use as a routine measure. In hospitals where this is employed as a routine measure the amount of narcotics or anodynes has been decreased more than one-half. The fear that the treatment will disturb the patient is not well founded for generally he will ask if it is not time for the next application.

Non-Union or Delayed Union. Here again given adequate fixation, diathermy or ultra-violet irradiation, or both, will ensure the formation of callus and if other suitable physical therapeutic measures be added functional restoration will result. Without fixation the chance of success is relatively small.

Arthritis. The etiological factors should be sought for and if found, eliminated. Frequently, under physical measures of treatment, symptomatic cures of many months in duration will be effected. The prescription will vary. In any event it should be a composite one selected from

the following: Hydrotherapy, heat, including the electric light bath cabinet, diathermy, galvanism, static electricity, massage carefully guarded as to time and character, and gentle manipulation.

There are many omissions. Much that is of real value has been left out. Some of the abuses of physical therapy both in its use and its non-use have not been mentioned. My only aim has been to show that:

1. Physical therapeutic measures of treatment are being placed on a sound and rational basis.
2. Physical therapy has secured civil and governmental recognition as one of the triad of medicine, surgery and physical therapy.
3. Nearly all the mysticism and much of the empiricism formerly inherent in physical therapy has been removed.
4. The wide-spread laboratory and scientific clinical investigations which are now under way will soon make it a more exact art.
5. In many conditions complete physical and functional restoration can only be secured by the use of physical therapeutics as an adjunct to standard medical and surgical procedures.
6. To secure this teamwork is essential.
7. Physical therapy should be practised on a broad and comprehensive basis.
8. If it is so practised not only will the time of disability be shortened but many who otherwise would have been hopeless cripples will be returned to financial independence.

Because of the standing physical therapy has already attained it will not in the future be necessary to close in the words of John Wesley, the author of the first book in English on electricity, who, in 1760, said: "Before I conclude I would beg one thing—it is that none of them would condemn they know not what; that they would hear the cause before they pronounce its sentence."

ABSTRACTS OF PAPERS DELIVERED AT SECTION MEETINGS

Section of Historical and Cultural Medicine, March 9, 1928

THE ORIGIN AND ANTIQUITY OF MAN IN AMERICA

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It affords me greater pleasure than I can express to speak in the Academy of Medicine. When I studied medicine in New York the Academy, and especially its Library, in the old building in 41st Street, was of the utmost value to me and I found so much there that I shall never cease to be grateful.

As the subject of my lecture this evening, perhaps I might have thought of something more medical, and yet I think that before we finish you will see that even in this subject, which seems so distant from the more direct medical interests, there is a good deal of human psychology, and here and there perhaps even a bit of psychiatry.

The question of origin and antiquity of the American Indian began to be a problem from the moment Columbus reached these shores. He, of course, believed to have reached only the eastern part of the Asiatic continent and that the people he encountered were the people of India, wherefore they came to be called Indians.

Later, when it became known that America was a separate continent, and that the people of America and all the larger islands about it were a race or body of people of their own, there developed much speculation in Europe as well as among those who already had reached this Continent, as to who these people were, and from whence they came. Unfortunately there was at that time but one recourse in all questions of this sort, which was the scriptures; so people began to search the scriptures, but they could find no reference to any such race as the Americans.

And so many reached the pernicious conclusion that, as long as these people were not mentioned in the scriptures where every human variety was accounted for, they could not be equivalent with other men, they were something less; which created a prejudice the results of which were sad for the Indian. The notion in fact became so mischievous that one of the Popes finally was obliged to issue a special "Bull" proclaiming that the Indians were human beings, equivalent to other more primitive peoples of the earth, and should be treated as such.

After this and as the Indian became better known, speculation took a different turn, and writers began to identify the Indian with various peoples of antiquity, particularly those near the seas and known to have been navigators. These identifications ranged from the Irish and Welsh to the Ethiopians, Phoenicians, Egyptians, etc. But the most prevalent idea was that the Indians were the descendants of the ten lost tribes of Israel.

The initial scientific inquiry into the matter begins with one of the fathers of the country, Thomas Jefferson, and with his learned contemporary, Professor Benjamin Smith Barton. From this time the studies advance by leaps and bounds and begin gradually to assume more solid foundations, this especially through the early government exploring expeditions. Clark and Lewis, Fremont, the Union Pacific surveys, and others—expeditions which brought back a great deal of new knowledge and also many specimens. Then followed the classic works of Samuel G. Morton, on Indian crania, by Squier and Davis on the Mounds, and by Schoolcraft and his associates on the living Indians.

The greatest impetus, however, to the study of the antiquity of the American Indian was given in the late fifties and especially the sixties and seventies of last century, by the discoveries of ancient man in Europe.

The first important human remains in Europe were discovered in 1848 on the Rock of Gibraltar; but they, up to

1863, remained hidden in the local museum and were unknown. In 1856, however, in Western Germany, near Düsseldorf, in the Neander gorge, workmen found a remarkable skeleton, which at first by even such authorities as Rudolf Virchow was taken to represent some human monstrosity. But some scientists of the time, including Huxley, and soon all the rest of the scientific world, became convinced that the remains represented an early and very noteworthy human type, hitherto unknown. As the result of this discovery the old skull of Gibraltar was resuscitated, cleaned of the rock in which it was enclosed, and was shown to be another striking example of ancient humanity; more than that, it proved to be the first known ancient lady—it was the skull of a female.

All this acted like a wild fire on the scientific circles, with the results that from that time on all through western and later on central and southern Europe, northern Africa, and surrounding parts, investigations of early man went intensively ahead; as a result of which there are such treasures, both in the cultural line and in the line of actual skeletal remains of ancient man, accumulated in the museums and institutions of Europe, that the whole subject has long since passed from the field of conjecture to that of ever growing and clearing knowledge of human evolution and human antiquity.

It was natural and logical that these discoveries in Europe should arouse interest in the question of antiquity of man in America, and it was not long before men like Thomas Wilson, who as a Consul in Switzerland became acquainted with the archeological remains of early man in Europe, began to believe to see similar conditions in America; from which it was only a step to declaring that ancient man or his cultural remains were also found in America.

In 1879, U. D. Whitney, a leading geologist and paleontologist of California, reports a remarkable "ancient" skull, known as the Calevaras cranium, believed to have been found in the tertiary deposits of a deep mine. But

later studies by Holmes, Merriam and others could confirm no such derivation of the specimen, and the skull finally was adjudged as that of a fairly recent California Indian.

There followed other findings of "ancient" man, a number especially on the western coast of Florida, where human remains were discovered actually in rock. Joseph Leidy, luckily, was able almost at once to subject these finds to careful study, and reached the rather simple conclusions that the remains, while petrified and actually enclosed in some cases in stone, were nevertheless of no extreme age and could be attributed to the Indian.

At the same time much attention was being given to the Mound Builders, and many reached the opinion that these, presenting so much higher culture than the "wild" Indians, must have been people of a different race, and probably of greater antiquity. This subsequently culminated in the remarkable belief of the geologist and paleontologist Winchell, of Minnesota, that the Mound Builders represented two distinct "dynasties," both of which were of Quaternary time. Since then, it is almost needless to say, these views were found to be wholly erroneous.

Still later, remarkable developments began to take place in Argentina. There a paleontologist of renown, Florentino Ameghino, began to report one after another human remains, more or less fossilized and found under such conditions, stratigraphic and as to associations with extinct animals, as seemed to indicate great antiquity. Before long he reached a remarkable classification of these remains, attributing some of them to very early men, and still others to prehuman creatures or human precursors. The latter he divided eventually into four classes which he called, respectively, the Prothomo, Di-, Tri-, and Tetraprothomo; and he believed to have found even lower creatures which have given rise to human evolution on this continent itself. His culminating hypothesis was that man evolved in South America, that over land connections he

reached Africa and then Asia, Europe, and finally North America.

Florentino Ameghino died, but his brother, Carlos, also a paleontologist, went him one better, announcing soon after the death of Florentino the discovery of a human-made arrowpoint in the femur of a Miocene *Toxodon*. The Miocene is so far back that not a trace of human beings or even of the human precursors can possibly be imagined in that period; yet there was the femur of the *Toxodon* with the arrowpoint sticking in it, and so it was concluded that man, and that already an arrow-using man, was contemporary with the animal.

Still later various additional finds of supposedly ancient man were made in North America, some cultural, in some instances merely charcoal, in others parts of human bones; and in each instance there were conditions which seemed to point to geological antiquity. The most notable of these finds were those of Trenton, New Jersey.

The subject was assuming such importance that the Smithsonian Institution made it a point to follow up these different discoveries. First was begun a critical study of the different older reports in North America, which was followed by that of the sites themselves and of the specimens; and in 1910 similar work was extended also to South America.

The earliest Smithsonian studies of this nature were those of William H. Holmes, in association with whom were men such as Salisbury and Chamberlain. One of the richest discussions of the whole subject took place in Detroit in 1897 at a meeting of the American Association, where the foremost workers interested in this problem were present, and discussed the whole question of man's antiquity in America. That meeting showed, perhaps for the first time, the marked and curious division between the views of the geologists and paleontologists favoring the acceptance of man's antiquity in America, and the more

We therefore went with considerable hope, and upon reaching Argentina were given all possible facilities. In fact Florentino Ameghino went for some weeks himself with us, along the isolated barren sand dunes of the coast. Much ground was covered, from Buenos Aires to Patagonia and from the east coast to the Andes. The objects reported as ancient were examined, the conditions studied—and we could not corroborate the antiquity. The *Diprrothomo*, for instance, was found to be merely the frontal portion of an ordinary human skull. The *Tetraprothomo* femur, the femur of some extinct cat. The “tierras cocidas,” or burnt earth, supposed to be of ancient human origin, proved volcanic.

As to associations with extinct forms, we found such associations. There were carapaces of *Glyptodones* and other fossil animal bones, unquestionably ancient, and near them and with them were arrow points, stone knives and other artifacts, even stone anvils upon which these things were made. But the association was evidently not that of antiquity.

Many of the human bones reported as ancient were petrified more or less; but we found conditions over large areas such that a bone could hardly escape becoming more or less mineralized in comparatively short time. There were, for instance, bones of beef and sheep, thrown out from a hut of Italians a few years ago, already heavier than normal and assuming more or less the aspect of fossilization.

In short, after an earnest piece of work, both Bailey Willis and myself could reach but one conclusion, and that was that the entire series of reports of early man in South America was based on conceptions that could not be sustained. And thus tumbled down the elaborate structure of ancient man also in that part of the American continent. For a complete report on the South American finds see Bull. 52, B. A. E.

Since, other geologists and paleontologists have reported “ancient” human remains from different parts of the

United States, especially from Florida. One of the most notable of these examples was the so-called Vero find, announced in 1916 by the geologist of the state at that time, Dr. Sellards. (See Bull. 66, B. A. E.). In that case six or seven scientists from different branches were invited to examine the position. Unfortunately, the invitation came only after the initial finds were extracted and after rains and other conditions removed the original section of the bank of the canal in which the remains were found. Nevertheless it was possible to make a large new exposure and this, together with the study of the discovered human bones, stone implements and fragments of pottery, left no ground for the supposed great age of the remains.

Still more recently finds of relics of ancient man are being reported by paleontologists again from Florida and also from Oklahoma, western Texas and New Mexico. Some of these finds are evidently of such a nature that they will necessitate prolonged and careful studies before any final judgment can be passed upon them. Others have already been discredited, most recently the one in Oklahoma (see *Science*, Feb. 10, 1928, p. 160).

And so we are laboring in trying to find and establish ancient man in America, with one failure or uncertainty after another. Even the best cases have left so far little more than a taste of disappointment.

How deceptive these matters are sometimes, and how they will delude even educated men, may be illustrated by a few examples.

A remarkable instance relates to the Rancho de La Brea human remains, in California. Not far from Los Angeles are found, in the semi-desert country, peculiar sinks or funnels in the earth, containing asphalt or pitch. In this asphalt are in places many bones of Quaternary animals, constituting veritable paleontological treasures.

In one of these pits of La Brea, in 1914, were found, among various animal bones, portions of a human skeleton, including the skull and lower jaw. And the lower jaw

looked very unusual. For the first time among our finds, there was a jaw that seemed to have a receding chin, as the more ancient jaws of Europe; and the skull itself seemed to be peculiar. Thanks especially to Dr. John C. Merriam, the whole subject received a careful expert scrutiny. And the result was but another disappointment. The skeleton, at first announced as very ancient, proved to be simply that of an Indian woman of a type well represented in California; and the chin had been rubbed off through friction in the funnel.

In 1924, during the construction of an outfall sewer for the city of Los Angeles, at some distance outside of the city, the bones of six human skeletons were found at a depth of 19 to 23 feet. Shortly after the first bones were found, the newspapers all over the country were surging with the news of the discovery, with more or less unbounded statements as to the antiquity of the specimens. They were older than the Neanderthal man, older even than the *Pithecanthropus*.

At that time the Smithsonian could not send anybody to see the discovery; but Dr. John C. Merriam, the head of the Carnegie Institution, asked Professor Stock of California, an able geologist, to go and examine into the conditions. And Professor Stock did an excellent piece of work. The skeletal remains were collected and the main parts brought to Washington, where they were examined and compared; and the site itself received all possible attention. The results were reported the same year by Stock and Merriam to the Academy of Sciences, at Washington. The gist of the report was that both the layers in which the bones were found and the bones themselves, were of but moderate, non-geological antiquity (see *Science*, July 4, 1924, pp. 1-5).

And so could be mentioned case after case. There is much romance in these things. I could entertain you the whole evening with enumeration of such cases alone, and some of the mistakes made sometimes are almost unbelievable. In one case one of our own colleagues, who has found

some human skulls and bones in California, reported them as of considerable antiquity, and as one of the evidences of this antiquity was given the fact that there were seven inches of separation between the two jaws of one of the skulls, which would be impossible in man of to-day.

In another recent case a paleontologist at a scientific meeting declared, showing a crushed skull from Florida—though by no means so crushed that there could not be recognized many of its parts and its modern type—that the crushing of it was an additional evidence of its antiquity, for it could hardly have been produced otherwise than by a mastodon stepping upon the ground containing the specimen.

So there we are! We see two lines of scientific men, all in earnest and bent on finding the truth, yet opposing each other diametrically on a problem that can not be settled by argumentation or beliefs, but only by as ample and unequivocal evidence as settled it in other countries. But here we strike again a lot of human psychology and even some psychiatry.

The remedy is, first of all, a more adequate preparation, experience and critique of those who would engage in these investigations. They are not for the amateurs, or the beginners, or those who take them up merely as a side hobby. I believe in the future every worker who undertakes to examine into the question of the antiquity of man in America should have due experience as well as other qualifications, and should be thoroughly acquainted with the conditions of human antiquity in the rest of the world, especially Europe. A worker without such qualifications is so thoroughly handicapped that he is in danger, whether on one side or the other, of making an error.

As it is, the anthropologists are accused that they cannot agree with the geologists because they have not studied geology. And the anthropologists retort, on the other hand, that they have studied all they need in the laboratories of Nature, and that the geologists and paleontologists are quite innocent of anthropology. And so it goes on.

The geologists and paleontologists tell us that stratification means a great deal. We tell them that on the basis of our experience, not book knowledge, stratification may sometimes be produced in almost no time, and cannot alone be decisive in many a given case. Most of the geologists and paleontologists place a great weight on fossilization of specimens. To the anthropologist fossilization is essentially a question of geophysics and geochemistry, and not of chronology. The geologists and paleontologists lay great store on association of extinct forms with the human; for many of them the dogma of "same horizon or stratum, same age" is the rule of rules; while the anthropologist gives little weight to such associations unless they are corroborated by all other evidence, knowing that man differs radically from animals through the introduction of his dead from $2\frac{1}{2}$ to 7 feet deep into the earth, regardless of the age of the deposits he penetrates or their contents. The average paleontologist believes implicitly that a bone of an extinct animal dates whatever human artifacts may be found with it; the archeologist says it is far more probable, in many cases, that the artifact dates the bone, or has no time relation with it whatsoever. And there are other points of difference. It would seem logical and relatively easy for the two sides to come together and settle these differences, but—psychology prevents.

The human remains in the Old World teach, in fact, a great deal. In the first place it is seen that, as the Ice Age advances, there are definite correlations between time and human culture, as well as physique. The farther back the time, the more primitive are both the physique of the man and also his culture, until somewhere in the earliest third of the glacial period there is reached a stage where even experts are not able to say, in many cases, whether an artifact is already an implement made by a human being or simply a work of nature; or whether the osseous remains are already fully human.

The conditions in Europe teach further that as the latest glaciation advanced man lived to a large extent everywhere, where he was present, in caves and rock-shelters.

Not one favorable cave or shelter for human habitation in old France, Belgium, Moravia, the foothills of the Pyrenees, and elsewhere, that has not been the place of habitation of some ancient man.

Furthermore, in these caves and the terraces or refuse heaps outside of them, as well as in his sites in the open air, the ancient man of Europe, Africa, etc., has left the amplest kind of evidence of his presence. He has left there his implements, in places literally by the thousands. In one of the Aurignacian sites lately discovered and where less than one acre of the many covered by the remains has been excavated, already more than 300,000 of objects worked by man, have been recovered. A cave on the Island of Jersey, not yet half excavated, has yielded to date over 20,000 stone implements and other objects of human industry. At La Quina, in southern central France, the specimens recovered are measured already by barrels and the site is still far from exhausted.

So everywhere, wherever ancient man lived, in caves or in open air, he has left not a single implement or what not, as appears in the American finds, but large numbers, such numbers that already they collectively clog some of the museums in Europe. Even our museums already have large collections.

In addition, early man, wherever he lived, lived essentially on the animals of his time. He was in the main a hunter. He trapped the great animals in holes in the ground, and killed the smaller animals in traps or in other manner. In the course of time he consumed great numbers of these prehistoric, now extinct, animals; and he left their bones as a testimony of his presence. These bones, the charcoal of his fires, besides the chips of the stones he worked and the implements that he lost or gave up or buried when he left, are there, and they show and teach plainly what the man was when he lived, in a large measure what he did and what animals he lived upon. Many of the animal bones show even where and how he cut the sinews or broke the bone to get at the marrow, or broke

the skull to get at the brain. There is a plain great book, in which it is easy to read for any intelligent man, not even a scientist.

Where are any such things in America? Where are the habitations and refuse accumulations of our old rivers and caves? Where are the implements, the bones of the animals upon which these old men have fed? The paleontologists say there have not yet been examined sufficient numbers of caves or sites. Let us not be deceived. The collective number of caves already examined by American paleontologists and geologists themselves, besides archeologists, already reaches a very respectable figure; while the open air sites and mounds explored reach into the thousands. Yet to this day not a single case of anything such as in Europe.

Where is the explanation of all this? What is the matter? If ancient man existed in America he could not have been represented by a few individuals who left a single or a few arrowpoints here and there in association with a single or a few fossil bones. In cities everywhere there are constantly carried on dredgings, excavations for foundations, water pipes, sewers. In the country there are innumerable railroad and road cuts. Many such have been watched or are supervised by educated men some of whom, at least, would report finds of odd things. But to no result.

A whole series of eminent men in American archeology, from Cyrus Thomas to F. W. Putnam, and Holmes, Fewkes, Hough, Mills, Moorehead, have given a large part of their lives to excavations and study of the American remains, but without finding a trace of anything earlier than the Indian.

The National Museum in Washington has in its collections over 12,000 old American crania from many parts of the two continents, and in the rest of the American and European Museums there are probably as many more; yet not a single specimen that could be accepted as of any real geological age.

This shows what tremendous difficulties are confronted in trying to establish man's geological antiquity in the New World, and these difficulties can not be done away with by mere semblances, or opinions, or assertions.

There is always also the great back-ground question, as to how could ancient man have reached America. It is known that up to the maximum of the last glaciation, man in Europe had hard times to sustain himself, reached no high numbers, and left even in that continent many of the available parts unoccupied. He may have spread thinly as far as the Caucasus, as far perhaps even as the Central parts of Asia or much of Africa. But this spread, according to all the sound indications there are, was a very slow spread and of a difficult nature, for there were as yet no means of transportation over waters, and no domesticated animals. Up to the middle Aurignacian period man had such imperfect and so few implements and so many other handicaps, that he cannot possibly be conceived as having spread over the ten or more thousands of miles over Asia towards the approachable parts of America, opposite Alaska. Before he could reach that far and pass over, he must have occupied all the more easily reached and better suited parts of Asia, and he must have developed means of effective coast navigation. All of which is inconsistent with glacial man as known from Europe.

These are the difficulties that confront the anthropologist in his quest for ancient man in America. Yet he keeps his mind open. It would not be worthy of a true scientist to be prejudiced, or even to give up hope while even the slightest chance of new and more satisfactory discoveries may remain. At the same time, the American student must be cautioned from ever accepting what cannot be proven to his full satisfaction.

One of the collateral important lines of studies, in these connections, was to find how much there is in America of a racial differentiation. And there was found remarkably little, which is inconsistent with any great antiquity. There are, it is true, sub-types of the American Indians, a number

of them ; but the differences between them are less than the differences between, for instance, the Italian and the Scandinavian in Europe. Why should man not have differentiated more in America if here since before these post-glacial differences were realized in Europe?

Anthropologists have also gone to Asia and scoured the lands there for vestiges of the race that has given the American Indian. And they found them, found them widely, and in some cases still so pure, so typical, that they could not be distinguished, physically and even in behavior, from the Indian.

One evening in Mongolia, at the end of the day, I was sitting down, a bit tired. Suddenly a Mongol was heard coming towards our house, singing. The song was Mongolian. I could not understand the words. But the intonation, the character of the song, was so utterly Indian that I had to turn and shake myself to find where I actually was, to appreciate that I was not among some of my old friends of the Mexican Sierras.

I must conclude. I merely want to add a second constructive suggestion. The first related to a more adequate and critical training of the scientific progeny, which will be called upon to grapple with the problems here dealt with when the older generation is gone. For the second—I regard as the most important step the creation, by the American scientific bodies that are most concerned, of a flying group or Committee, composed of the most experienced men in all the branches, which would be notified of every promising find and which would go wherever circumstances warranted to examine on the spot, and before things were disturbed, all that was to be examined.

DISCUSSION

DR. BRUNO OETTEKING: The problem which has been so ably presented to us to-night by my learned friend and colleague, Dr. Hrdlicka of Washington, you have seen is

one of enormous magnitude. With the science of physical anthropology a number of other sciences are implicated such as geology, zoology and paleontology, archeology, and so forth. However, when it comes to the real nucleus of the problem, then we have to deal with the physical man, man in all his appearances and in all his different surroundings and which the scientist of to-day calls the phenotype of man.

Man, himself, as Dr. Hrdlicka has also explained, occurs in the line of evolution in certain successive forms. We are generally agreed to recognize two different types of mankind, one very primitive and one more advanced. The primitive type of mankind is *Homo primigenius*, as represented by the Neandertal race with a number of varieties, which has been found over a fair stretch of the surface of the earth, particularly, however, in Europe, France, Spain, Croatia, and of late in Africa and Asia Minor.

This primitive type of mankind, the *Homo primigenius*, is of a very crude appearance and so are his cultural achievements, as important as his place in the history of evolution ever may be. But Nature herself always progresses from the crude to the more refined, and from the simple to the more complex. The different finds to which I have just referred as having been made in various localities and in different parts of the world have all more or less the same common characters of primitivity. These are recognized, for instance, as a very low and sloping forehead, supraorbital ridges, the so-called occipital torus, a very broad nose, projecting jaws, the general crudeness of the skeletal bones but particularly of the femur which is the strongest bone of the entire skeletal system of man and of which we have a number of excellent specimens, such as the Neandertal femur, and a number of others of the same type.

The following more refined type of man which occurs toward the end of the glaciations is a direct forerunner of the present or recent type of man. The recent type of man was called *Homo sapiens*, the wise man or the man

who knows, by the great classifier Linnaeus, in consideration of the other forms of highest vertebrate development, which as a mammalian order he called primates.

Now the most ancient representative of this more modern, more recent human type is the man of Cro-Magnon, and it is from this form that the present types of man known as racial differentiations are derived.

The methods by which the physical anthropologist distinguishes and differentiates these various phylogenetically distinct types of mankind up to the recent racial differentiations are the methods of physical anthropology and it may perhaps be of interest to give a brief description of them.

From a general viewpoint we can distinguish between descriptive and metrical methods. By the descriptive methods, for instance, the color of the skin, the hair, the iris, etc., are distinguished. This is done preferably by means of a color table. The intensity of coloring or pigmentation is due to the amount of pigment in the skin which is of organic origin and which in the body household serves as a protection against the injurious rays of the spectrum, in particular the ultra-violet.

The color is not the only criterion in racial description. There is also the form of the hair, the form of other integumental appendages like the eyelids, lips, the female breast, and a number of other diagnostics. Descriptive methods can be practiced to an excellent degree of exactness by a conscientious and discriminating observer. However, the still more exact means of physical research is given by the metrical methods which account for the size of the body and its parts, and afford their proportional treatment. One of these measurements, or rather a computation from two of them, is quite popular and known as the cephalic or cranial index. The two principal diameters of the human head or skull, *i.e.*, their length and breadth, are involved in it and the index derived from them is indicative of short- or longheadedness, and the intermediary forms.

It is an interesting observation that from the evolutionary angle the primitive type of hominoid appearance and their close relatives, the anthropoid apes, are longheaded or better longskulled. This holds true for the greater number of them, for instance, the Neandertal, and even the still more primitive *Pithecanthropus erectus*, which was also mentioned to-night. Among a greater number of specimens of the Neandertal type, however, recovered by Gorjanovic-Kramberger at Krapina in Croatia, the occurrence of a shortheaded variety could be stated by that author.

In the following more advanced type of Cro-Magnon we have a similar occurrence, *i.e.*, the man of Cro-Magnon was longheaded. I believe it was the German anatomist Schaaffhausen who spoke of a disharmonious type of skull in characterisation of the cranial configuration of the Cro-Magnon. Thus, while the face of the more advanced type of skull is more in correlation, with the brain case, *i.e.*, a narrow face in connection with a long and narrow brain-case, the Cro-Magnon has a broad face in connection with a narrow brain-case which from the viewpoint of configuration gives rise to a disharmonious cranial appearance.

The longheaded variety of mankind is still the predominating one in certain parts of the earth. In the more primitive types, in fact, in the lowest ethnological layers, like the Australians, Melanisiens and certain Negro tribes there obtains pronounced dolichocephaly. However, there are also dolichocephalic varieties in different parts of Europe, while on the whole, a tendency toward a rounder head seems to be the general trend in human evolution. There are whole provinces, whole domains in the Old World where longheadedness has been replaced by broad- or shortheadedness. First, for instance, in the greater part of Central Europe, proceeding northward even as far as Scandinavia, and the northwestern regions of Europe.

Speaking of methods used in physical anthropologic research, the descriptive and metrical ones have been mentioned. These, however, do not exhaust the anthropolo-

gist's ways and means, and in order to round out the picture the physiologic methods of blood reaction and blood agglutination should at last be enumerated. By the former the degree of blood relationship between man and closely related primate forms is estimated by the degree of serum reaction between any two types, while by the blood agglutinative reaction racial relationship is recorded.

What has all this got to do with the American aborigines? Well, exactly the same as what we may apply to other racial types anywhere in the world. We use the same methods of anthropological research upon the American aborigines, the descriptive as well as the metrical ones. And I may say that the physical anthropologists in America are fully aware of the task before them, since their specific research represents a problem which is still in its primary stages of solution. There cannot be any doubt, however, that by concentrated effort we will be able sometime fully to solve the problem connected with the derivation and racial affinities of the American Indian. It is by the exemplary efforts of the principal speaker of the evening that valuable advances in that direction have already been made.

MR. N. C. NELSON: It seems necessary to say a word about the general status of the evening's discussion. As matters stand, you will all, I fear, go away with the idea that the problem before us is hopelessly many-sided and difficult. Such a conclusion is certainly warranted from what you have heard. Nevertheless, please bear in mind that each one of the speakers, if he could be heard through, has a fairly consistent story to tell; and be assured, moreover, that if the discussion could go on for another hour or two you would detect indications of agreement such as do not now seem possible.

Dr. Hrdlicka without doubt has given our topic more serious study than any other man living. By comparison I feel as if I had myself done next to nothing. To date I

have to my credit only five or six field investigations bearing directly on the problem, and so far nothing decisive or even promising has come of these studies. In addition I have reviewed the literature bearing on a long list of earlier discoveries. The result is that I am personally not at all enthusiastic about the outlook for demonstrating the great antiquity of man in America.

In general, Dr. Hrdlicka has confined his remarks to skeletal remains. He has specialized, of course, on that type of data. On the other hand, I have specialized on cultural data and I might properly bring the discussion to a close by merely saying that on the whole my conclusions correspond pretty closely to his own. By this I mean that practically all the recorded archeological discoveries in America for which geologic antiquity has been claimed (including the one at Folsom, New Mexico, described for us by Dr. Brown) agree in showing skeletal types or artifact types which, in terms of our knowledge of somatic and cultural developments for the world as a whole, are both essentially modern. In other words, our oldest artifact remains are typically Neolithic, while of the true Paleolithic culture complex, recognizable over the greater portion of the Old World, we have in the New World not yet positively isolated a single trace.

It is a temptation, however, to add a few words in an effort to show you the seemingly paradoxical nature of our problem. I have made a hasty analysis of probably most of the discoveries and alleged discoveries relating to the geologic antiquity of man in America. All told I have on record no less than 164 finds. Seventy-four of these were accompanied by fossil remains, comprising more than twenty extinct animal species. One hundred and four consisted of tools and weapons, while the other sixty disclosed human skeletons. Twenty-four finds were made in caves and one hundred and twenty-four in open geologic exposures such as the one Dr. Brown has shown us. Sporadic and more or less accidental as these interesting discoveries have been, they spread over about a century of time

and they were made by people in all walks of life, including men of scientific training and experience. Geographically the finds range from southern Canada to Patagonia and geologically they are said to extend from post-Glacial times back to the Miocene epoch. Now the Miocene, according to recently revised time reckonings, dates back approximately ten million years. Consequently, the investigator who may be disposed to accept at face value our 164 American discoveries recited above is confronted with two rather difficult propositions. For one thing, he is compelled to grant that an advanced type of culture—the type generally called Neolithic—such as first appears in Egypt and Mesopotamia about 20,000 years ago, in America commenced ten millions of years earlier. For the other, he is forced to admit that this Neolithic culture persisted in America for ten million years without appreciable modification! No student of early human developments at all familiar with the archeological facts presented by the Old World can possibly entertain any such view with reference to the New World.

On the other hand, it is claimed that our human precursors existed in western Europe since before the Miocene epoch. We have recently obtained proofs that already in Pleistocene times man ranged from England south through Europe to Rhodesia and South Africa; southeast through Palestine and Java to Australia, and eastward to the vicinity of Peking in China. Under these circumstances it becomes hazardous to affirm that man was not also present on the American continent during the Pleistocene. The fact that the skeletons found here are of modern stamp does not necessarily disprove their great antiquity. There are those to-day who believe that when our early ancestors separated themselves from the rest of the animals by starting on a cultural career, they at the same time stepped out of the great stream of forces which make for organic evolution. Man since that day has been under no necessity to undergo radical bodily modifications by way of specialization or adaptation to new environments: When occasion required he changed, not his body, but his

culture—a thing much more quickly effected. Now Sir Arthur Keith, of the Royal College of Surgeons in London, believes that he finds, among the fossil remains of the Old World, evidence of a modern human type dating back to and beyond the times of the primitive Neanderthal men. At any rate, he is certain that *Homo sapiens* is of very ancient origin and that therefore our modern-looking American skeletal finds may well have a right to the geologic age claimed for some of them.

But if man's physique has been comparatively stable since his culture began, the same cannot be said for culture itself. Culture is an exceedingly plastic phenomenon, especially in its higher stages. Moreover, it has never been known to burst into full bloom without previous cultivation or transplantation from without. When therefore we seek to explain the genesis of our American Indian accomplishments we have no choice but to look to the Old World, and when we do we find there the counterparts of many of the basic American elements. Thus one might name almost offhand nearly one hundred simple tools and weapons which are common to America and at least portions of the rest of the world. And when we seek for the forerunners of these implements we find them not in the New World but in the Old.

In conclusion I may add that for my own part I am sitting on the fence with respect to the whole question of the antiquity of man in America. True, I lean now this way and now that; but I have scarcely any doubt at present as to which way I shall ultimately jump. To tell the truth I am no longer greatly concerned about this phase of our American problem. In the meantime, should it be of interest to anyone, I would say in closing that the Neolithic culture may very well be of really considerable duration on this continent. Thus, if we may judge at all from the apparent date of origin and the rate of development of this culture phase in different parts of the Old World, it seems entirely possible for man to have sojourned in America for a period of anywhere from 7,000 to 15,000 years.

DISCUSSION

RECENT FINDS RELATING TO PREHISTORIC MAN
IN AMERICA

BARNUM BROWN: In my hand (displaying a box containing stone artifacts) I hold the answer to the antiquity of man in America. *It is simply a question of interpretation.*

Those who have reviewed the subject extensively will, I think, agree with Dr. Hrdlicka that prehistoric man was an emigrant to America; that he probably came from Asia; that he was Mongoloid; and that the first emigrants did not arrive in America until after man had reached a development superior to the Neanderthal race.

Probably there have been several dribblets of emigration, but as to when the first emigrants arrived in America we differ.

If we hypothecate a route by which people reached America from Asia at one time, there is no reason for supposing this route did not persist over a great period of time and permit more than one emigration.

Taking into consideration the physical development of the less progressive peoples of to-day, especially some of the Mongoloids, the ancestral stock of the present day Indians probably existed in America long before historic time. Since his first appearance in America man has used stone implements, and if we could find the skeletal remains of the very first emigrants they probably would not differ greatly from those of primitive Mongoloids of to-day.

Dr. Hrdlicka makes all of his comparisons with finds made in Europe, but such comparisons are not entirely warranted, for conditions in Europe and America are not the same. In Europe where most of the remains of prehistoric man have been found, there are great areas of eroded limestones with caves and natural shelters. In America we are dealing chiefly with plains, or forested sections, where caves and shelters do not exist. In the Southwest, however, where there are sandstone caves and

shelters, we find evidence of prehistoric man, but of a comparatively recent date.

Since early Pleistocene time, among fossil mammals many species have undergone little or no change, and some cannot be distinguished from those living to-day. They constitute as much as 25 to 40 per cent. Not a single genus of mammals has been evolved during the whole of the Pleistocene period. During this time some races of men probably continued for long periods with little physical change. I am sorry the short time does not permit me to discuss more than one of the several occurrences that many feel establish the presence of early man in America.

One of the cultural phases I am exhibiting here to-night—artifacts that were found associated with the remains of an extinct species of bison found in New Mexico, during the past two years by an expedition from the Colorado Museum of Natural History. Many artifacts similar in form are to be found in various museum collections in the United States, but they have not before been recognized as representing a cultural phase. Now that we can associate them definitely with an extinct animal, of considerable antiquity, and the surrounding conditions preclude their having been made by historic men, they are definitely recognized as a cultural phase.

These artifacts are of distinct Laurelate form, excavated or fluted on both sides, and are retouched to a finer degree than any heretofore discovered, rivalling, if not surpassing, the workmanship of any stone culture in Europe or Egypt. A distinctive feature is the form of the blade, hollowed on the sides with the widest part anterior to the middle. Unlike the triangular form of modern arrowpoints, which wedge from the moment they enter a skin until they penetrate beyond the barbs, this type of point makes the greatest incision at the initial impact, thus, with the same impetus, penetrating farther into a resisting body than the triangular point. These artifacts are probably darts, antedating the bow and arrow, and if they are recognized as distinctive, may be designated as the "Folsom culture."

Folsom, New Mexico, is about 60 miles east of Raton, in the northern part of the State. Much of the country is covered with lava 30 to 130 feet in depth overlying Niobrara shales. In places the lava plateau has been eroded. At this particular point the lava has been eroded forming a horseshoe-shaped basin covering an area of approximately five square miles. The walls of the basin are vertical and we think the flow was of Pliocene age. There are numerous extinct craters in this vicinity. Subsequent to the erosion of this basin, one of the craters again became active throwing a secondary flow across the two prongs of the horseshoe, thus closing it at the lower end. This flow is 40 feet in depth. Undoubtedly it dammed up the natural drainage and a lake was probably formed in the lower part of the basin.

If I have interpreted the occurrence correctly a group of prehistoric bison were surrounded on the upper border of this lake by a number of prehistoric men and several bison were killed—probably a meat-kill. Eight skeletons, or partial skeletons, so far have been recovered and test holes sunk last year reveal bones underlying an area equal in extent to that already excavated, so that we may assume there were at least eighteen or twenty bison entombed at this place. The site of the quarry is on a level with the top of the secondary lava flow.

Subsequently the impounded water has broken through the secondary lava flow and carried part of it away, the basin drainage now passing at the face of the flow. During recent times a ravine has cut through the strata that overlaid the skeletons and exposed some of the bones. In 1925 Mr. Fred J. Howarth and Carl Schwachheim discovered these bones. The find was reported to the Colorado Museum of Natural History and Mr. J. D. Figgins, Director of the Museum, investigated the finds. Mr. Schwachheim, with assistance, excavated there in 1926-27, taking out remains of eight bison skeletons—seven bulls and one cow. The cow skeleton was articulated and the seven bulls somewhat disassociated.

One of the bulls is now mounted in the Colorado Museum of Natural History, and it shows many characters that distinguish it from other species. It has recently been named *Bison taylori*. The animal was relatively higher in the flank than the living bison, bones extremely massive with the highest spines of the dorsal vertebrae only 19 inches in height, whereas, those of a large living bison are 23 inches in height.

The principal characters, however, are found in the enormous skull with its wide-spreading horns, great width between the eyes and extremely narrow muzzle.

In the first year's work an artifact was found near one of the ribs, and another on the same bone level, but not distinctly associated with the ribs. On resuming work the second year two other points were found on the dump where they had been uncovered by winter rains. This material had been thrown out during the previous year's excavation—during the last of the quarry work, which was at the bottom of the quarry. While in Utah, in September, 1927, I received word from Mr. Figgins that a fifth point had been found. We went immediately to the excavation and after making a careful examination of the geology and surrounding circumstances, I had the satisfaction of removing the last five inches of sediment that covered the fifth point.

The sediment that covered these skeletons is restratified Niobrara shale eight feet thick. A careful examination of this fifth point *in situ*, precludes any possibility of it having been introduced subsequent to the burial of the skeletal remains. This point laid within 2 inches of a rib and parallel to it. Ribs and arrow were taken up together in a block and are exhibited in Denver.

In this part of New Mexico the average yearly rain fall is 14 inches. The quarry site is less than three-quarters of a mile from the abrupt lava cliff that forms the border of the basin, and the material that forms this deposit must have accumulated by freshets at intervals during a long

period of time. Chamberlin and Salisbury have determined that it takes three thousand years to denude one foot of surface in the Mississippi valley. Now if we reverse this process and apply the same standard of comparison to deposition, it would have taken twenty-four thousand years for this deposit to accumulate over the bison remains. I am convinced, however, that this is only an estimate of the time involved. On account of the sheltered situation the estimate is probably too low.

In conclusion: After finding this definite type of fluted, or excavated, point associated with an extinct bison we have searched many collections and find fourteen of similar shape and peculiarity in the Andover collection; one hundred and eighty in the Ohio State Archaeological and Historical Society collection; several in the Kentucky collection and several in the American Museum collection—all from central and western states. So far as known these were surface finds, but previous to the Folsom discovery no one was able to distinguish them as a cultural phase, and it is quite possible that there are other, at present, unrecognized cultures represented in collections of stone artifacts.

Section of Neurology and Psychiatry, May 8, 1928
**CASE REPORT ILLUSTRATING THE EARLY
 DIAGNOSTIC SIGNIFICANCE OF
 THE ENCEPHALOGRAM**

E. D. FRIEDMAN

P. B., farmhand; born in Russia; 36 years old; single. Patient was first admitted to the neurological service of Bellevue Hospital on July 13, 1927. His chief complaints were headache, pain over the entire right side, dizziness especially following forced defecation, "lights before his eyes," pain behind the ears, especially in the morning, and generalized convulsions. The latter had occurred at irregular intervals for one and a half years prior to his admission.

Family history was negative.

Previous history: Served in the Russian army during the War, and was gassed. Contracted gonorrhoea in 1917, and suffered from right sided pleurisy in 1918. Tonsillectomy was performed in 1923.

Physical examination revealed good pupillary reactions, normal fundi and no visual field defects. There was a slight right facial weakness with widening of the palpebral fissure. The abdominals were diminished on the right, and the right plantar response was equivocal. The right corneal reflex was diminished. Pin-prick was better perceived on the left and the patient complained of subjective pain on the right. There were no other sensory changes. No aphasia.

Spinal fluid was clear, colorless and aside from the presence of 54 cells per c.mm. revealed no abnormalities. Spinal and blood Wassermann tests proved negative. The cerebrospinal fluid pressure reading was 420 mm.

The diagnosis of a focal lesion in the left hemisphere was made; and encephalography was suggested in order to determine the nature of the lesion.

Lumbar insufflation of air was carried out on August 7, 1927. The encephalogram revealed a shifting of the ventricular system to the right. The anterior horn of the left ventricle was narrowed. The third ventricle was obliquely displaced to the right and the anterior horn of the right lateral ventricle was somewhat dilated. The encephalographic appearance was that of left cerebral neoplasm.

The general medical status proved negative. X-ray examination of the chest revealed no abnormalities. The urine showed no abnormal findings aside from a faint trace of albumin. Blood pressure readings were 132/84.

Patient left the hospital at his own request.

He was readmitted on December 28, 1927. His chief complaints at this time were recurring fits, loss of strength

and impairment of "memory." He still spoke of bright colors before his eyes just before the convulsive seizures, which recurred about once a week. They seemed to be provoked by loud noises (acoustico-motor reaction), and were followed by persistent dull pain over the entire right side. The members of his family observed a notable impairment of his memory and a marked slowing up of his cerebration. He did not seem to understand spoken words as well as he previously did. This was especially true of conversation in English (his more recently acquired language).

Physical examination revealed no impairment of the sense of smell on either side. Visual acuity was 20/20 in each eye but perimetric examination now showed notching of the upper temporal field on the right and the upper nasal field on the left. The blind spots were enlarged in both eyes. The fundi showed the presence of papilledema, more pronounced on the left. There was definite weakness of the right side of the face, also evident on mimetic innervation. The tongue deviated somewhat to the right. There was a slight motor weakness of the right side. The deep reflexes were more active and the abdominals diminished on the right. The right plantar response was equivocal. Temporal anemia was now present. Neither agraphia nor alexia could be demonstrated. It was observed that the convulsive episodes began with twitching of the right arm and that they were followed by weakness of the right side and by the appearance of a definite Babinski sign on the right. There were no uncinata phenomena or dream states.

The clinical diagnosis of left temporo-sphenoidal neoplasm was made and operation was advised.

Exploratory craniotomy was carried out on February 15, 1928. Under local anesthesia, an osteoplastic flap was turned down on the left side, exposing the parietal and temporal lobes.

The dura was tense and did not pulsate. A needle was inserted into the posterior portion of the temporal lobe and

about 10 c.c. of dark brown semi-fluid material was evacuated. A second needle was introduced into the anterior portion of the temporal lobe with similar results.

The dura was incised; the brain appeared yellow and the convolutions flattened. The cortex in the temporal region was incised. A large necrotic mass was palpated in the depths and about 15 c.c. of this was removed.

The dura was left open. The bone flap was cut away slightly at its lower margin to allow a small decompression far from the motor cortex, and the flap was returned to position very loosely to permit an increase in intracranial volume.

Post-operative course: Patient has done fairly well since the operation. The convulsions have not returned. There have been no striking changes in his neural status except for the recession of the papilledema.

Comment: The history and the meagre findings in the beginning were suggestive of focal disease in the left hemisphere. The encephalogram gave the clue to the nature of the pathological process long before the advent of papilledema.

The location of the neoplasm, medially and deep, probably accounted for the thalamic pain on the right.

THE SURGICAL TREATMENT OF GLOSSOPHARYNGEAL NEURALGIA WITH REMARKS ON THE DISTRIBUTION OF THE GLOSSOPHARYNGEAL NERVE

BYRON STOOKEY

Dr. Byron Stookey presented a patient on whom he had done an intracranial dorsal root section of the glossopharyngeal nerve. Complete relief of all pain followed immediately after dorsal root section with no recurrence of pain.

Thus far only eighteen cases of true glossopharyngeal neuralgia have been described in the literature. This case is the first to be done at the Neurological Institute. The patient complained of paroxysmal sudden severe pain beginning in the region of the tonsil and base of the tongue, and referred to the front of the ear and region of the maxillo-mandibular joint. The paroxysms were brought on by swallowing or by touching the base of the tongue or tonsil. The pain of glossopharyngeal neuralgia is so typical that once seen it is readily distinguished from trigeminal neuralgia.

A single incision suboccipital craniotomy was done and the nerve sectioned as it left the brain stem without injury to any of the adjacent nerves, particular care being taken to cut only the funiculus of the glossopharyngeal root so that a pure glossopharyngeal paralysis would result. Thus an almost unprecedented opportunity was presented for a study of the function and distribution of the ninth nerve. Isolated paralysis of this nerve has been unusually rare and thus far only two previous isolated dorsal root sections of the ninth nerve have been done.

Dr. Stookey found clinically that the glossopharyngeal nerve had no independent representation in the cutaneous innervation of the ear. That the naso-pharynx, Eustachian tube, soft palate, anterior and posterior pillars of the fauces, tonsil, base of the tongue and dorsal wall of the pharynx, receive their sensory innervation from the ninth nerve. The motor innervation was found to be the palatopharyngeus and palatoglossus muscles with a fiber to the superior constrictor. The latter muscle receives, however, its major innervation from the vagus.

Section of Obstetrics and Gynecology, May 22, 1928

PUERPERAL MORBIDITY AND MORTALITY

P. BROOKE BLAND

Philadelphia

Puerperal morbidity and mortality are the chief concern of the conscientious obstetrician and it is recognized that pregnancy has its perils.

In the septic days of Mariceau, Holmes and Semmelweiss septic mortality was high compared to that of 2.7 per 1000 live births to-day.

In this country more than one expectant mother out of every 200 dies in labor or shortly thereafter. The United States Children's Bureau statistics indicate that nearly 25,000 mothers die annually in this country. In 1915 the death rate from all puerperal causes was 6.1 per 1000 live births and in 1905 the rate was 6.5 per 1000. Compared with figures available from 20 other countries the United States had the highest mortality of all in 1924-25.

Since morbidity precedes mortality, it is obvious that it is wholly impossible to improve our mortality statistics unless we first improve our morbidity statistics. Far too many women are being sacrificed on the altar of maternity. The subject of the high rate of maternal mortality has been given concern in other countries and the Chief Medical Officer of Great Britain, Sir George Newman has urged the importance of better obstetrical care in many of his reports although the rate in England was 4.1 per 1000 live births in 1926.

The causes of mortality are chiefly septicemia, toxemia and hemorrhage. Septic infection claims more than one third of the victims and there is lack of prenatal care, indiscriminate manipulation and injudicious implemental delivery.

It is believed that 75 per cent. of the cases of sepsis are associated with repeated internal examination and various

injuries. Repeated examinations, injudicious manipulation and operative procedure favor infection.

I would recommend the restriction of all local examinations to the abdominal wall except in complicated emergencies during labor.

The mortality from Cesarean sections runs as high as 88 per 1000 and of 100 deaths following this method of delivery 30 per cent. are caused by septicemia. There is a decided reaction in this country against the use of instruments in normal cases to hasten delivery as the increased risk is more generally recognized.

Hemorrhage is the third factor of importance in causing mortality. The causes of hemorrhage are equally divided between a normally placed placenta and placenta previa. Hemorrhage from premature separation of the placenta is almost invariably an expression of the toxemia of pregnancy. The dangers of unavoidable hemorrhage may be largely reduced if diagnosis is made promptly and active interference is performed. Delay promotes an increased percentage of maternal deaths.

Recommendations made at the annual meeting of the British Medical Association in 1905 to have a morbidity standard that all postpartum cases that had a temperature of 100 or more should be considered morbid. Similar recommendations were made at the Congress on Puerperal Fever in Strassburg in 1923.

I believe that a standard of morbidity in this country is very desirable and I make an earnest plea for a conventional standard of maternal morbidity in the United States.

The various standards so far suggested are wide apart:

1. In the Boston Lying-In Hospital, Newell's standard is 100.4 and his percentage of morbidity is recorded as 4.5 per cent.

2. The standard followed in the Carney Hospital is also 100.4 but Phaneuf says his percentage is 10 per cent.

3. George Gray Ward in the Women's Hospital, New York, regards every patient as morbid in whom the temperature reaches 100.6. During the year 1922 with 507 deliveries the morbidity was 1.38 per cent.

4. The standard in the Lying-In Hospital, New York, is 100.4 or more on two successive occasions exclusive of the first twenty-four hours. In 1927 with 4,871 deliveries there were 201 patients or 4 per cent. classed as morbid.

5. Harold Bailey in his service in the Bellevue Hospital employs a standard of 100.4 for two days excluding the first day. His total obstetric morbidity is recorded as 9.6 per cent. The morbidity rate for the operative cases is reported as 21.7 per cent. The mortality rate covering a period of five years with 5,520 indoor and outdoor deliveries was .59 per cent., a most commendable record.

Dr. Bailey properly believes that the exclusion of both vaginal and rectal examinations during labor, reduces the morbidity and in 58 per cent. of the 4,396 indoor patients, no vaginal or rectal examinations were made.

6. In the Long Island College Hospital, Polak follows the 100.4 standard. He reports a morbidity of 5.8 per cent.

7. In the Philadelphia Lying-In Hospital, the standard is a temperature of 100, on two occasions after the first day. For the past three years the morbidity has consistently ranged around 29 per cent.

8. The standard followed in the Department of Obstetrics, Jefferson Medical College Hospital, is a temperature of 100.4 on two successive or on two different days after the first twenty-four hours. Under this system, our percentage of morbidity is rarely below 30 per cent. The percentage for 1927 was 31 per cent.

9. In St. Margarets Hospital, Pittsburgh, Titus uses the standard followed in the Rotunda Hospital, Dublin, namely 100. He reports a morbidity of 20 per cent.

10. Williams, in the Johns Hopkins Maternity, employs a standard of 100.4 at any time during the puerperium except the twenty-four hours immediately following delivery. His morbidity is reported as 13.56 per cent. in white and 25.21 per cent. in colored patients.

11. In the Chicago Lying-In Hospital a patient is regarded as morbid in whom the temperature reaches 100 on a single occasion from the moment of delivery until the day of dismissal from the hospital. Under this rigorous standard, or as DeLee says, "the strictest of all standards," only 1881 or 11 per cent. of the 17,275 patients confined from 1918 to 1925 inclusive, were, he claims, registered as morbid. By estimating the morbidity according to the standards of the British Medical Association, only 801 or 4.1 per cent. of the patients could be placed in the morbid category.

12. Findley, of Omaha, Nebraska, employs the standard of 100.4. He believes that fully 33 per cent. of his patients reach that point by the third day, postpartum. His morbidity percentage, he says, he does not regard as excessive, but "An honest to goodness acknowledgment of facts."

From the recital of the foregoing, it is observed there is no marked variation in the standard of morbidity employed by the institutions named, ranging from 100 to 100.6. The majority seemingly favor a standard of 100.4. The variation in the morbidity percentage is the conspicuous feature of this meagre study, ranging from a little over 1 per cent. to beyond 30 per cent. With a standard precisely the same, differing only in the fraction of a degree, it is difficult to reconcile the vast discrepancy in the figures reported.

It is proposed in Great Britain to set up a representative maternal morbidity committee by the Minister of Health and if a conventional standard could be applied in this country, it would serve for promoting scientific study, for statistical comparison, for scientific uniformity of classification, and for fostering better obstetrical work in general.

There should also be a standardization of the principal causes of morbidity and these should be divided into the intrinsic and extrinsic causes. The intrinsic causes should include the following:

1. All forms of septic infection, both pelvic and systemic.
2. Traumatic or wound infection.
3. So-called lochial retention.
4. Mammary infection.
5. Phlebitis, always an expression of infection.

We should remember in endeavoring to prevent maternal mortality that the most skillful obstetrician of all is Nature herself. John Mowbray (1724) said that it was one of the duties of the "man midwife" to "watch the patient during pregnancy so as to prevent all preternatural disorders."

John W. Ballantyne in 1901 recommended pre-maternity clinics and secured pre-maternity beds in the Royal Maternity Hospital at Edinburgh and before his death in 1923, there were over 600 pre-maternity clinics in England and thousands of others throughout the world.

In New York City in a study made of 8,743 mothers who received pre-maternity nursing under the direction of the Maternity Center and the Henry Street Settlement, the mortality from eclampsia was reduced to about one-third of the usual percentage. Ninety-five per cent. of these patients with toxic albuminuria earlier went to full term.

The maternal death rate amongst these women from all puerperal causes except septicemia, was 2.06 per 1000 live births compared with 2.84 in Manhattan Borough as a whole.

The reports of the Obstetric Department from the City Hospital, Louisville, Huddersfield, England, Toronto General, and Antenatal Clinic have demonstrated that pre-maternity care largely reduces the death rate from puerperal morbidity.

The profession finally as a whole must be brought to realize that pre-maternity care and a scrupulous aseptic regime are peerless essentials in the general obstetric plan. Injudicious operative obstetrics, or to designate it by its proper descriptive name, meddlesome midwifery, is not in accord with sound obstetric philosophy.

To neglect the former and practice the latter will one day have to be accounted for to an educated and comprehending public, for adequate supervision of every patient during pregnancy and assiduous care during parturition are the factors of safety on which motherhood chiefly must depend.

BOOK REVIEW

A NEW HISTORY OF SURGERY*

For now many years, a history of surgery of moderate compass, at once readable and reliable, has been a desideratum. Gurlt's three volumes of 1898, checked by Sudhoffs' massive contribution on mediæval surgery (1914-18), constitute the standard reference works and store-houses of information up to the end of the 16th century. Few busy surgeons, however, have time to read them in the original, and here, Sir Clifford Allbutt's delightful St. Louis address (1905), covering much the same ground, has been a primer of immense service to English-speaking physicians. Billings' survey, in the Dennis "System" (1895), was the most accurate, informing and critical account of the whole subject in English, but as being constructed along the old Haeser-Daremborg plan of paragraphing a long succession of names, *more bibliographico*, it is a bit dry and disappointing, hence is more an infallible librarian's reference-manual, for checking up on facts and dates, than a going or inspiring narrative, to be read and reached out for with gusto. Apart from Allbutt's little book, which is quite as precious and symphonic in its way as (say) Stopford Brooke's "Primer of English Literature," the nearest thing we have to a moving, informing narrative is perhaps George Fischer's "Surgery a Hundred Years Ago" (1876), which was Englished by C. H. von Klein in the *Journal of the American Medical Association* during 1897-8 (vols. xxviii-xxx *passim*). The volume before us, by Dr. Walter von Brunn, professor of medical history at Rostock, was, as the talented author states in his preface, written to be read rather than to be shelved for reference. A book of this kind obviously fills a long-felt want. Illustrated with no less than 317 effective cuts, its deliberate object is to set off the recent mechanisation of surgery, which has occasioned so many timely growls and heartfelt groans on the part of our German colleagues. The

*W. von Brunn: *Kurze Geschichte der Chirurgie*, iv (1 l.) 339 pp. 8°. Berlin, J. Springer, 1928.

surgeon's calling, like the dentist's, does happen to be, in part, mechanical, whence, as von Brunn very rightly affirms, his readiest cultural offset is to be found in the history of his profession; meaning by "culture," not the namby-pamby, pigeon-livered, Bunthorne concept of the man in the street, but "the knowledge of the best that has been thought and said in the world," the knowledge which is power. For this reason also, as our author truly says, no one could (or should) hope to write a meaningful history of surgery who is not an actual practitioner of the art. The tyro reveals his inability to think surgically at once. To convey the essential *raison d'être* of surgery, the historian must answer three leading questions: Why is surgery? What is surgery? Whence and how came surgery? The best answer to the first query (always transcendental) is perhaps contained in an observation of Rebecca West—"To those who fall and hurt themselves, one runs with comfort; by those who lie dangerously stricken by a disease one sits and waits," which takes us at once into the rationale of prehistoric man's thorn-punctured abscesses, fish-toothed saws and decompressive trephining against blindness, at the same time stressing the Roman (Themison) view of internal medicine as "a meditation upon death." Surgery has thus always preceded internal medicine, as being the most aggressive and effective of all arms of primitive therapy, a purposeful attempt to "meet death coming" and cheat impending doom. How came it? Initially, from the primitive intuition that "relief from suffering is an attainable goal," which, in mechanics, is Maupertuis' Principle of Least Action, or as the old Scotch lady said, getting rid of a temptation by yielding to it; for even a monkey will pick at a biting insect or an offending thorn. Later came simple observation of the effects of puncture, incision, boring (trephining), sawing or even of letting well enough alone. From his initial sentence—"the oldest of healing methods is surgery"—our author winds into these questions with intelligence and ability. Getting rid of foreign bodies and staunching hemorrhage was the probable starting point. Then came splinting of fractures

(the dog on three legs), trephining with chipped flints and the fashioning of knives and saws. Throughout these antique phases, the scheme of illustration is so exhaustive and complete that it would make an almost intelligible "movie" of the subject. The neat groups of primitive and ancient surgical instruments, assembled and photographed by Meyer Steineg and Sudhoff, are all included, and one misses nothing except such items as the Venetian bleeding glasses of the 17th-18th centuries, the wound-suckers of the 18th century, certain statues, inset plaques or medals commemorating famous surgeons, effective pictures of recent military phases or modern oil paintings of surgical operations. Striking indeed are the Finnish bath (p. 30), the ex-voto objects (44-52), the Etruscan bridge-work (81), the kits of Roman instruments (106-107), Andry's crooked tree as an analogue of the strapped scoliotic spine (247) and the idyllic photo (286) of Billroth at St. Gilgen ("*Das ist ein Abend wie ich keinen sah*"). The atrocities which pass for Behring (256) and Mikulicz (287) might easily be replaced by better photos in a later edition. The narrative throughout is flowing and going, there is but little cluttering up of the story with factual references (dates), which have been otherwise well taken care of in von Brunn's introduction to the Kirschmann and Nordmann System (*Die Chirurgie*, Berlin, 1926, I, 1-76). Our colleague sustained very grave mutilating injuries in the late war, which have compelled him to relinquish the actual practice of his profession for the teaching of its history. His book is cordially recommended to American surgeons as an attractive and reliable introduction to the subject. Merely to glance at the pictures is to understand why the ancient Teutonic name for surgery was *die Heilkunde* (the healing art) and why great soldiers like Frederick and Napoleon sniffed at internal medicine (a poor thing in their day), but loyally upheld the surgeon.

F. H. GARRISON.

COMMITTEE ON PUBLIC HEALTH RELATIONS

MATERNAL MORTALITY

A REPORT TO THE COMMITTEE ON PUBLIC HEALTH
RELATIONS

HAROLD BAILEY

We have many times heard the statement that the United States stands eighteenth on the list of civilized nations as regards maternal mortality. If this is true it is disgraceful and should spur us on in our efforts to reduce this death rate. On March 27, 1927, according to a report in the *New York Times*, Sir George Newman of the Ministry of Health of England, at his lecture at Yale University, made the statement that the "present maternal mortality of America is the highest among civilized nations of the earth, and twice that of Great Britain." This statement is clearly an exaggeration of the facts as I showed in a table which compared the rates of Great Britain with those of the United States for 1921 and 1922 and which was published in the *American Journal of Obstetrics and Gynecology*, December 1926. I present this table again with the two succeeding years added and while there is very little difference in the crude rates of the United States and Great Britain, the adjusted rate is slightly in favor of the latter country. It must have been that Sir George Newman intended to refer to England when he compared us with Great Britain for England alone has a rate that averages around 3.9 per 1000.

MATERNAL MORTALITY IN ENGLAND, SCOTLAND, WALES AND
THE UNITED STATES

(From U. S. Census Report)

	Rate	All Puerperal Causes				Puerperal Septicemia			
		1921	1922	1923	1924	1921	1922	1923	1924
Eng., Scot. & Wales	Adjusted	6.9	6.0	6.2	5.7	3.2	2.2	2.6	1.8
	Crude	8.1	7.2	6.9	6.6	3.5	2.5	2.7	2.2
United States	Adjusted	6.7	6.6	6.5	6.2	2.6	2.3	2.4	2.3
	Crude	6.6	6.5	6.4	6.1	2.6	2.3	2.4	2.3

In regard to our place on the list of nations, the crude rate for the United States for 1924 was 6.1 and the following countries were as high or higher: Canada 6.6, Denmark, Norway and Sweden 6.4, Ireland 7.9, Germany 6.3 and Poland 6.1. The adjusted rates for the same year put us at 6.2 and all other countries as low or lower excepting Ireland which was 8.3. Admitting that our rate is altogether too high for a country with the facilities from the standpoint of wealth and of interest in maternal care, let us inquire into the causes.

WHAT ARE THE CAUSES OF THE HIGH MATERNAL DEATH RATE?

1. *The Mixture of Races in this Country.* In the first place it seems to be due in part to our racial mixture. Race influences the size and the general conformation of the pelvis, as for instance, Indians and Negroes have small round pelvis while the Germanic races have large pelvis with open outlets. The Nordic countries and Germany have very little pelvic deformity so that operative interference in labor is lessened.

2. *The Negro Women.* Our registration area in 1915 consisted of ten states and the District of Columbia. Today it consists of thirty-nine states and the District of Columbia and includes practically all the Southern states. Therefore, a considerable number of states with a high Negro death rate enter into the total death rate for the United States. The death rate of Negro women during 1924 was 11.8 as compared to 6.1 per 1000 for the white women. This is partly due to the Negroes' entire disregard of hygiene and ordinary care and partly to imperfect registration of births, i.e., a high percentage of miscarriages are not recorded because the United States bases its rate on live births. The live births and stillbirths recorded together would give a much more favorable comparison provided the registration was complete. Finally it is quite evident that the lack of medical care or even the care of a trained midwife at the time of delivery is probably the

largest factor in the high Negro death rate. I will speak later of the Negro women in New York City and what may be done with concentrated care.

3. *Postabortal Sepsis.* Another factor increases the general rate and that is the deaths from postabortal sepsis which are listed under maternal mortality. Abortions in New York State are one in every four births and one-third are criminal, as estimated by the late Dr. Eichel of the New York State Department of Health. In other cities the abortions are much more frequent. In St. Louis they are estimated 1 in 2.3 births; in Minneapolis, Adair gives the figure as one in three plus births. If it is advisable to record these deaths from sepsis following abortion, they should be classified as postabortal sepsis and not included in the maternal mortality rate; otherwise we have women who have never borne children dying and being classified under the maternal death rate.

4. *Operative Interference.* One-third of our maternal deaths are due to puerperal sepsis and about 26 per cent. to toxemia with or without convulsions. At least 40 per cent. of the fatalities from sepsis follow operative interference. In the United States there is undoubtedly too much operative interference. We have teachers in the great centers in this country encouraging vicious teaching. DeLee urges his so-called "prophylactic forceps operation" which is quite an extensive surgical procedure and should never be attempted by the general practitioner; and Dr. Potter practices his so-called "prophylactic version" which with him means a podalic version in every case possible. Then there is the high incidence of Cesarean section which in Potter's cases is 7 per cent. and in some localities reaches a figure as high as 9 per cent. Where an attempt is made to keep down the number of Cesarean sections the incidence is low. On my Bellevue Hospital service it is 1.7 per cent. for a five year period, 1921-1926.

In the State of New York one out of every five women die following Cesarean section. In Massachusetts the deaths are one in seven and the fatality for the operation

is 8.8 per cent. Many of these deaths, of course, are due to imperfect selection of the cases, Cesarean being done for eclampsia and on cases late in labor and which are already infected. As an example of how high the Cesarean death rate can run, one hospital in New Orleans reported 117 cases of abdominal section with 12 deaths due to peritonitis, 2 to sepsis, 2 to the operation and 25 to the disease for which the operation was performed, the total rate for Cesareans being 35 per cent. It may be added that in the same issue of the same journal, a paper from Chicago showed a death rate from the low transperitoneal Cesarean of less than one per cent.

5. *Failure to Hospitalize Cases.* There is another point that applies very largely throughout the country. The general practitioner believes that he is credited by his patients with being able to care for women in labor and therefore when operative intervention is necessary, he hesitates to send his patients to a hospital and seldom consults a specialist. The result is a serious operation performed in the home with the nearest doctor available acting as consultant and assistant.

WHAT IS THE OBSTETRICIAN DOING ABOUT THE MATERNAL MORTALITY?

1. *Time and Better Teaching.* Proper teaching should repeatedly stress the need of conservatism in the operative treatment of women in labor. Teachers are demanding more time from the medical colleges for teaching obstetrics and they are attempting to teach more practical obstetrics, using less of the didactic methods.

2. *Demonstrations.* The obstetrician is demonstrating that complete care will reduce the death rate. These demonstrations are made in correlation with nursing organizations like the Maternity Center Association and the Henry Street Settlement in New York and also in many clinics. In Dr. Beck's Long Island College Clinic, he was able to reduce the mortality for one year to 2.5 per 1000. At the Berwind Maternity Clinic in Harlem we were able

over a five year period to reduce the death rate of white women to 2.6 and that of the colored women to 3.9, or a total of 3.2 per 1000. Both these clinics—one in South Brooklyn and one in Harlem—are used for teaching fourth year students who are in residence at the clinics. The city rate for the same years was from 4.2 to 5.0 per 1000. The Maternity Center Association reports that in 1999 so-called "closed cases" there were 5 maternal deaths or a rate of 2.5 per 1000. Thus it has been definitely shown in the City of New York that the rate may be lowered about one-half by prenatal, natal and postnatal care.

THE SHEPPARD-TOWNER ACT

The Federal Government combined with the State Governments is making efforts to decrease the mortality by teaching prenatal care and by lecturing to practitioners in urban centers, and where the teaching has been carried on there has been a lowered death rate from toxemia. In States like Virginia where there is a real need for trained midwives to care for the Negro women, no effort is being made to train the midwives, for in Virginia they are following an impossible ideal represented by the slogan "a doctor to attend every woman in labor." The work carried out under the Sheppard-Towner Act is frequently directed by women who have not the practical knowledge of obstetrics desirable for such positions.

STATISTICAL STUDY

A committee composed of the heads of the obstetrical hospitals in New York with Dr. E. H. Lewinski Corwin as chairman is now studying obstetrical statistics both in and out of the hospitals of the City. Under the auspices of the Hospital Information and Service Bureau this committee has already made a detailed comparative study of 4,000 stillbirths which have occurred in hospitals and their report will soon be ready for publication. They are also attempting to introduce a uniform nomenclature as it is impossible to consider live birth and stillbirth statistics

unless we have a standard definition of abortion and stillbirth. The Committee recommends the following definitions and hopes to have them adopted by all statistical registrars.

"The term stillbirth applies only to an infant born dead after the period of viability, that is the 28th week or 6½ calendar months or 7 lunar months of pregnancy, and which is approximately 1500 grams or 3 pounds in weight and about 35 centimeters or 14 inches in length."

"In recording a stillbirth a distinction must be drawn between a death before labor (antepartum), and during labor (intrapartum)."

"Fetuses born previous to viability shall be known as abortions; a distinction should be drawn between early and late abortions."

"An expulsion of the product of conception during the first 12 weeks of pregnancy should be considered as an early abortion."

"An expulsion of the product of conception from the end of the 12th week, or after the development of the placenta, and up to the 28th week should be considered as a late abortion."

The Committee hopes to provide also a statistical review on the deaths from sepsis and toxemia throughout the City. They hope in addition to have a certain group of hospitals operating with routine technic, in order to report the most favorable methods of treating certain obstetrical conditions.

COMMITTEE ON MEDICAL EDUCATION

ANNUAL GRADUATE FORTNIGHT

OCTOBER 1ST TO 14TH, 1928

PRELIMINARY ANNOUNCEMENT OF PROGRAM

The Problem of Aging and of Old Age will be the topic of the first Fortnight and will be discussed from many angles. Particular consideration will be given to the early recognition and prevention of disturbances which are often the underlying causes of aging. The program will include morning, afternoon and evening sessions each day.

SESSIONS IN TEACHING HOSPITALS

Special courses and clinical lectures and demonstrations have been arranged in over forty of the teaching hospitals of the city. (9 to 12 a.m. and 2 to 4 p.m.). For the purposes of the Fortnight the hospitals of the city have been divided into three groups. The hospitals of each group will present programs similar in character and scope so that it will be possible for the physician to spend a full day in the hospitals of one section of the city and thus avoid the necessity of making long trips between hospitals.

Among the subjects which will be presented in the hospital program are:

Allergy, arthritis and orthopedics, blood chemistry, bronchoscopy, cardiology, dermatology and syphilology, diabetes, functional diagnosis, gastro-enterology, gynecology, hypertension and nephritis, neoplasms—cancer, neurology, ophthalmology, otolaryngology, pathology, physical therapy, pneumonia and infectious diseases, proctology, radiology, general surgery, traumatic surgery and urology.

SESSIONS AT THE ACADEMY OF MEDICINE

During the Fortnight there will be two sessions daily at the Academy, one in the late afternoon (5 to 7 p.m.), the other in the evening (8:30 to 10:30 p.m.). Supper will be served at the Academy for those desiring it.

The list of speakers includes Sir Farquhar Buzzard, Pierre Janet and Vittorio Putti, from abroad, and the following Americans:

Harlow Brooks	Frederick T. Lord
Lawrason Brown	Jerome M. Lynch
Samuel A. Brown	George M. MacKee
Thomas R. Brown	John E. MacKenty
Leo Buerger	Harrison S. Martland
Alexis Carrel	John J. Moorhead
Russell L. Cecil	Herman O. Mosenthal
Arthur F. Chace	Bernard Sachs
Alfred E. Cohn	Charles R. Stockard
Charles F. Collins	Solomon Strouse
Louis I. Dublin	Frederick Tilney
William Engelbach	George E. Vincent
James Ewing	Alfred S. Warthin
Nellis B. Foster	Benjamin P. Watson
Howard Fox	Franklin W. White
Menas Gregory	Linsly R. Williams
Foster Kennedy	William R. Williams
Alexander Lambert	William H. Wilmer
Samuel W. Lambert	Francis Carter Wood
Emanuel Libman	John Wyckoff
Edward Allen Locke	Edwin G. Zabriskie

Among the subjects which will be discussed by the speakers are: Postponement of the individual processes of aging; pathological processes in aging; clinical aspects and management of old age; importance of anatomical pathways in diseases of middle life and old age; arteriosclerosis and aneurism; the relation of disorders of the ductless glands to senescence; traumatic surgery; bronchitis and asthma; physical therapy and climatology; hypertension; the psychoses; the myocardium; angina pectoris; arthritis; gastro-enterological problems; aging of the human brain; diet and body weight; apoplexy.

No fees will be charged for attendance at any of the clinics or meetings on the program.

RECENT ACCESSIONS TO THE LIBRARY

- Adrian, E. D. The basis of sensation.
Lond., Christophers, 1928. 122 p.
- Alsaker, R. L. Outwitting old age.
N. Y., Grant, 1927. 307 p.
- Association for research in nervous and mental diseases. Schizophrenia (dementia praecox).
N. Y., Hoeber, 1927. 491 p.
- Beaumont, G. E. & Dodds, E. C. Recent advances in medicine. 4. ed.
Phila., Blakiston, 1928. 426 p.
- Bennett, H. E. School posture and seating.
Boston, Ginn, 1928. 323 p.
- Blum, S. Practical dietetics for adults and children in health and disease.
3. ed.
Phila., Davis, 1928. 380 p.
- Brocq, A. J. L. Clinique dermatologiques. 2. sér.
Paris, Masson, 1927. 659 p.
- Brooks, R. O. Critical studies in the legal chemistry of foods.
N. Y., Chem. cat. co., 1927. 280 p.
- Brousseau, K. Mongolism.
Balt., Williams, 1928. 210 p.
- Bruchl, C. P. Birth-control and eugenics.
N. Y., Wagner, 1928. 249 p.
- Brunpt, E. Précis de parasitologie. 4. éd.
Paris, Masson, 1927. 1452 p.
- Burn, J. H. Methods of biological assay. . . .
London, Milford, 1928. 126 p.
- Clinch, H. G. The smoke inspector's handbook; or economic smoke abatement.
London, Lewis & co., 1923. 136 p.
- Cabot, R. C. Social service and the art of living. Rev. ed.
N. Y., Dodd, Mead & co., 1928. 214 p.
- Calmette, A. L'infection bacillaire et la tuberculose . . . 3. éd.
Paris, Masson, 1928. 883 p.
- Cazzani, U. La ipodermoterapia nella tecnica farmaceutica e nella pratica medica.
Milano, Ist. sieroterapico Milanese, 1928. 563 p.
- Chopra, R. N. & Chandler, A. C. Anthelmintics and their uses in medical and veterinary practice.
Balt., Williams, 1928. 291 p.
- Clinical pediatrics. Supervising editor, Royal Storrs Haynes.
N. Y., Appleton, 1928. v. 11-15.
- Cotte, G. Les troubles fonctionnels de l'appareil génital de la femme.
Paris, Masson, 1928. 570 p.
- Damon, S. R. Food infections and food intoxications.
Balt., Williams, 1928. 266 p.

- Desvernine, C. M. *Etude sur le traitement de la tuberculose pulmonaire chronique.*
Paris, Arnette, 1928. 98 p.
- Eisenberg, A. A. *Principles of bacteriology.* 4. ed.
St. Louis, Mosby, 1928. 228 p.
- Ellis, W. B. *Sanity for sale.*
Advance, N. C., Advance pub. co., 1928. 179 p.
- Emerson, C. P. *Physical diagnosis.*
Phila., Lippincott, 1928. 553 p.
- Ewing, A. J. *Why the Volstead law should be modified.*
Kansas City, Mo., Burton, 1927. 68 p.
- Fielding, M. *Parenthood: design or accident?*
London, Labour pub. co., 1928. 96 p.
- Foote, J. A. *State board questions and answers for nurses.* 6. ed.
Phila., Lippincott, 1928. 491 p.
- Foote, J. A. *Materia medica and therapeutics for nurses.* 4. ed.
Phila., Lippincott, 1928. 415 p.
- Foster, N. B. *The examination of patients.* 2. ed.
Phila., Saunders, 1928. 392 p.
- Franklin, B. *Essays of . . . moral social and scientific.*
N. Y., Putnam, 1927. 180 p.
- Freud, S. *The problem of lay-analyses.*
N. Y., Brentano, 1927. 316 p.
- Graham, E. A.; Cole, W. H.; Copher, G. H., & Moore, S. *Diseases of the gall bladder and bile ducts.*
Phila., Lea & Febiger, 1928. 477 p.
- Gun, W. T. J. *Studies in hereditary ability.*
Lond., Allen, 1928. 288 p.
- Hallock, G. T. & Turner, C. E. *Health heroes. Louis Pasteur: Edward Jenner.*
Bost., Heath, 1928. 2 vols.
- Hamilton, A. E. *This smoking world. . . .*
Lond., Methuen & co., 1928. 178 p.
- Harris, H. W. *Human merchandise.*
Lond., Benn, 1928. 272 p.
- Humphris, F. H. *Artificial sunlight and its therapeutic uses.* (4. ed.)
Lond., H. Milford, 1928. 306 p.
- Hunter, A. *Creatine and creatinine.*
Lond., Longmans, 1928. 281 p.
- Kendrew, W. G. *The climates of the continents,* 2. ed.
Oxford, Clarendon pr., 1927. 400 p.
- Kennedy, F. & Stevenson, L. *Your nerves and their control.*
N. Y., Appleton, 1928. 172 p.
- Keynes, G. *A bibliography of the writings of William Harvey, M. D., discoverer of the circulation of the blood.*
Cambridge, Univ. pr., 1928. 67 p.

Kraupa, E. Der Glasbläserstar.

München, Bergmann, 1928. 119 p.

Ludovici, A. M. The night-hoers or, the case against birth-control and an alternative.

Lond., Jenkins, 1928. 288 p.

McCarrison, R. The simple goitres.

Lond., Baillière, 1928. 106 p.

Maier, H. W. La cocaine. Histoire, pathologie, clinique, thérapeutique, defense social.

Paris, Payot, 1928. 493 p.

Maxfield, K. E. The blind child and his reading.

N. Y. Am. found. for the blind, 1928. 215 p.

Mind (The) of the growing child. Edited by Viscountess Erleigh.

N. Y., Oxford pr., 1928. 229 p.

Moltke, O. Contributions to the characterization and systematic classification of *Bac. proteus vulgaris*.

Copenhagen, Levin, 1927. 196 p.

Muhphy, J. Primitive man; his essential quest.

London, Milford, 1928. 341 p.

Myers, J. A. Fighters of fate.

Balt., Williams, 1927. 318 p.

Nessler, C. The story of hair.

N. Y., Boni, 1928. 277 p.

Osborn, H. F. Man rises to Parnassus.

Princeton, N. J., Princeton univ. pr., 1928. 250 p.

Pacchiai, P. Guida dell'ospedale Maggiore di Milano.

Milano, Cerelli, 1926. 372 p.

Peake, H. & Fleure, H. J. Peasants & potters.

New Haven, Yale univ. pr., 1927. 145 p.

Peake, H. & Fluere, H. J. Priests & kings.

New Haven, Yale univ. pr., 1927. 307 p.

Petty, O. H. Diabetes; its treatment by insulin and diet. 4. ed.

Phila., Davis, 1928. 155 p.

Polano, D. Geburtshilflich-gynäkologische Propädeutik. 5. Aufl.

Leipz., Kabitzsch, 1928. 224 p.

Pryde, J. Recent advances in biochemistry. 2. ed.

Lond., Churchill, 1928. 379 p.

Rand, B. Correspondence of John Locke and Edward Clarke.

Cambridge, Harvard univ. pr., 1927. 605 p.

Robertson, W. & Porter, C. Sanitary law and practice. 6. ed.

Lond., San. pub. co., 1928. 815 p.

Roland of Parma (surnamed Capelluti). La chirurgia di.

Roma, Ist. naz. med. farmacole. 1927. 28 ff.

Ruckmick, C. A. Mental life.

N. Y., Longmanns, 1928. 253 p.

Schlapp, M. G. & Smith, E. H. The new criminology.

N. Y., Boni, 1928. 325 n.

- Shears, G. P. *Obstetrics, normal and operative.* 8. ed.
Phila., Lippincott, 1928. 745 p.
- Soiland, A. *Cancer.*
N. Y., Appleton, 1928. 143 p.
- Sorrin, S. & Miller, S. C. *Practice of periodontia.*
N. Y., Macmillan co., 1928. 160 p.
- Taylor, A. S. *Taylor's principles and practice of medical jurisprudence.*
8. ed. Ed. by S. Smith. With a . . . rev. by W. G. H. Cook.
Lond., Churchill, 1928. 2 v.
- Taylor, G. *Environment and race.*
Lond., Milford, 1927. 354 p.
- Taylor, W. S. *Morton Prince and abnormal psychology.*
N. Y., Appleton, 1928. 136 p.
- Teulic, G. *Les rapports des langages néologiques et des idées délirantes...*
Paris, Picard, 1927. 164 p.
- Thompson, C. J. S. *Mystery and lure of perfume.*
Phila., Lippincott, 1927. 247 p.
- Unconscious (The).* A symposium. (By) C. M. Child, Kurt Koffa, John E. Anderson, et. al.
N. Y., Knopf, 1928. 260 p.
- Veidovsky, F. *Structure and development of the "living matter."*
Prague, Royal Bohemian soc. of sci., 1926-7. 359 p.
- Vernede, C. H. *Geschiedenis der Ziekenverpleging.*
Haarlem, Bohn, 1927. 400 p.
- Vigano, L. *Practical serology...* Tr. by E. M. Heffer. Ed. by C. G. L. Wolf.
Cambridge, Heffer, 1928. 221 p.
- Watson, J. B. & Watson, R. *Psychological care of infant and child.*
N. Y., Norton, 1928. 196 p.
- Whitmore, E. R. *Keeping young after forty.*
N. Y., Appleton, 1928. 207 p.
- Why men fail.* Edited by M. Fishbein & W. A. White.
N. Y., Century co., 1928. 344 p.
- Windle, C. A. *The case against prohibition.*
Chic., Iconoclast pub. co., 1927. 197 p.
- Worrell, W. H. *A study of races in the ancient near East.*
Cambridge, Heffer, 1927. 139 p.
- Wright, W. *Muscle function.*
N. Y., Hoeber, 1928. 188 p.

JEFFERSON MEDICAL COLLEGE AND HOSPITAL

The Committee on Archives of the Jefferson Medical College and Hospital of Philadelphia will appreciate gifts of, or information concerning, paintings, etchings, drawings, silhouettes, busts, photographs or cartoons of physicians who have served the hospital as internes or have been members of the staff of either college or hospital. Etchings, wood cuts, photographs or similar souvenirs of college or hospital buildings of the past will be gratefully received. All gifts or information concerning potential gifts or loans may be addressed to the Committee on Archives, care of The Chief Resident Physician, Jefferson Medical College Hospital, Philadelphia.

DEATHS OF FELLOWS OF THE ACADEMY

ARTHUR WALKER BINGHAM, M. D., 15 East 76th Street, New York City; graduated in medicine from the College of Physicians and Surgeons, New York City, in 1900; elected a Fellow of the Academy March 4, 1926; died, June 9, 1928. Dr. Bingham was a member of the Roosevelt Hospital Alumni Association, a member of the Society of Alumni of Sloane Hospital for Women and Attending Physician at the Willard Parker Hospital.

SIMON JOSEPH WALSH, M. D., 134 West 86th Street, New York City; graduated in medicine from the College of Physicians and Surgeons, New York City, in 1879; elected a Fellow of the Academy May 5, 1904; died June 11, 1928. Dr. Walsh was a member of the American Medical Association, a Fellow of the American College of Surgeons, Visiting Surgeon to the St. Vincents and Columbus Hospitals and Consulting Surgeon to St. Josephs, Far Rockaway and St. Josephs in Yonkers Hospitals.

ANSEL IRWIN MILLER, A. B., M. D., Brattleboro, Vermont; graduated in medicine from the College of Physicians and Surgeons, New York City, in 1884; elected a Fellow of the Academy December 7, 1905; died June 15, 1928.

JONATHAN WRIGHT, A. B., M. D., Windy Rock, Pleasantville, New York; graduated in medicine from the College of Physicians and Surgeons, New York City, in 1883; elected a Fellow of the Academy December 5, 1889; died May 26, 1928.

BULLETIN OF THE NEW YORK ACADEMY OF MEDICINE

VOL. IV.

AUGUST, 1928

No. 8

THE FIRST GRADUATE FORTNIGHT

The problem of aging and of old age will be the topic of the Fortnight. The complete program is presented herewith. Coördinated clinics and clinical demonstrations will be held in thirty hospitals during the mornings and early afternoons. Late afternoon and evening sessions will be held at the Academy.

SESSIONS AT THE ACADEMY (5 AND 8:30 P.M.)

Oct. 1st. Afternoon. Opening Session.

Introductory Remarks. Dr. Samuel W. Lambert, President N. Y. Academy of Medicine.

Dr. Louis I. Dublin, Statistician Metropolitan Life Ins. Co.
The treatment of arthritis deformans of the hip. Prof. Vittorio Putti, Institute Rizzoli, Bologna, Italy.

Evening. The doctor—Trainer or healer? Dr. George E. Vincent, President Rockefeller Foundation.

Carpenter Lecture. Pathological processes in aging. Dr. Alfred S. Warthin, Prof. of Pathology, Univ. of Michigan.

Oct. 2nd. Afternoon. Importance of anatomical pathways in diseases of middle life and old age. Dr. Harrison S. Martland, City Hospital, Newark.

Postponement in the individual process of aging. Dr. Linsly R. Williams, President N. Y. Tuberculosis & Health Ass'n.

Clinical aspect and management of old age from the practitioner's point of view. Dr. Charles F. Collins, New York City.

Evening. Syphilis in elderly persons. Dr. George M. MacKee, Prof. Dermatology & Syphilology, Post Graduate.

Diseases of the skin in old age. Dr. Howard Fox, Prof. Dermatology, N. Y. University.

Oct. 3rd. Afternoon. Arterial diseases of the brain and cord. Dr. Foster Kennedy, Prof. Clinical Neurology, Cornell.

Spinal cord diseases. Dr. Edwin G. Zabriskie, Att. Physician, Neurological Inst.

Evening. The aging of the heart muscle regarded from a general biological point of view. Dr. Alfred E. Cohn, Rockefeller Institute.

- Dr. Alexis Carrel, Rockefeller Institute.
 Arteriosclerosis and aneurism. Dr. E. J. G. Beardsley, Assoc.
 Prof. Medicine, Jefferson Med. College, Philadelphia.
- Oct. 4th. Afternoon. Dietetics in old age. Dr. Samuel A. Brown,
 Prof. Pharmacology, N. Y. University.
 Pharmacology in old age. Dr. Alexander Lambert, Visiting Phy-
 sician Bellevue.
 Alcohol in old age. Dr. Samuel W. Lambert, Pres. N. Y. Acad-
 emy of Medicine.
 Evening. The relation of disorders of ductless glands to sen-
 escence. Dr. William Engelbach, Engelbach Clinic, St. Louis,
 Missouri.
 Menopausal and post-menopausal conditions in women. Dr.
 Benjamin P. Watson, Prof. Obst. & Gynec., Columbia Univ.
- Sir Farquhar Buzzard, Regius Prof. Medicine Oxford.
- Oct. 5th. Afternoon. Gastro-enterological problems. Dr. Arthur F.
 Chace, Prof. Medicine Post Graduate.
 Food and food habits. Dr. Solomon Strouse, Associate Prof.
 Medicine, Univ. of Chicago.
 Evening. Traumatic surgery and the problems of age. Dr. John
 J. Moorhead, Prof. Traumatic Surg. Post Graduate.
 Osteomalacia and Paget's disease. Dr. Edwin Allen Locke,
 Clinical Prof. Medicine, Harvard.
 The conditions of the rectum in old age. Dr. Jerome M. Lynch,
 Prof. Proctology, Polyclinic.
- Oct. 8th. Afternoon. Pneumonia in old age. Dr. William R. Williams,
 Att. Physician, New York Hospital.
 Bronchitis and asthma. Dr. Frederick T. Lord, Boston.
 Evening. Tuberculosis. Dr. Lawrason Brown, Saranac Lake.
 Climate and the aged. Dr. Gerald B. Webb, Colorado Springs.
 Psychoses in old age. Dr. Menas S. Gregory, Dir. Psychopath-
 ology, Bellevue Hospital.
- Oct. 9th. Afternoon. X-ray and radium in the problem of old age.
 Dr. Francis Carter Wood, Dir. Radiol. Therap., St. Luke's
 Hospital.
 Special aspects of neoplasms in the aged. Dr. James Ewing, Prof.
 Pathology, Cornell.
 Diseases of the arteries of the extremities. Dr. Leo Buerger,
 Att. Surgeon, Bronx Hospital.
 Evening. Aging of the human brain. Dr. Frederick Tilney, Prof.
 Neurology, Columbia.
 Apoplexy. Dr. Bernard Sachs, Consulting Neurologist, Mt. Sinai
 Hospital.
- Oct. 10th. Afternoon. Hypertension. Dr. Herman O. Mosenthal,
 Dir. Dept. Med. Post Graduate.
 Nephritis in old age. Dr. Nellis B. Foster, Assoc. Prof. Medicine,
 Cornell.

- Evening. Harvey Lecture. Senescence and rejuvenescence from a biological standpoint. Prof. C. M. Child, Univ. of Chicago.
 Present status of the problem of the so-called rejuvenation. Dr. Charles R. Stockard, Prof. of Anatomy, Cornell.
- Oct. 11th. Afternoon. The myocardium. Dr. John Wyckoff, Clin. Prof. Medicine, N. Y. Univ.
 Angina pectoris. Dr. Harlow Brooks, Prof. Clin. Medicine, N. Y. Univ.
- Evening. Infectious diseases and old age.
 Arthritis and old age. Dr. Russell L. Cecil, Vis. Physician, Bellevue.
- Oct. 12. Afternoon. Liver and biliary passages. Dr. Franklin W. White, Instr. in Medicine, Harvard.
 Digestive problems. Dr. Thomas R. Brown, Assoc. Prof. Clin. Medicine, Johns Hopkins.
- Evening. Carcinoma of the larynx. Dr. John E. MacKenty, Senior Surgeon, Man. E. E. & Throat Hospital.
 Diseases of the eye in old age. Dr. William H. Wilmer, Prof. Ophthalmology, Johns Hopkins.
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Programs of special clinics and clinical demonstrations which have been arranged in the hospitals cooperating in the Fortnight.

DOWNTOWN GROUP

- BELLEVUE HOSPITAL, Functional diagnosis, infectious diseases, tuberculosis, anaesthesia, fractures, treatment of arteriosclerosis of senile heart, gangrene and amputation, handling urinary cases, surgical problems in the aged, diseases of the chest shown by X-ray, eye conditions, ear conditions, psychopathic cases, diabetes and endocrinology.
- BETH ISRAEL HOSPITAL, Functional diagnosis, cardio-vascular diseases.
- FRENCH HOSPITAL, Asthma and hay fever, the relation of allergy to skin diseases in old age, roentgenology.
- NEW YORK HOSPITAL, Asthma and hay fever, metabolism, traumatic surgery, Paget's disease, myocardial conditions, hernia in the aged, post-operative care, post-operative lung conditions, peripheral arterial diseases, peptic ulcer.
- N. Y. EYE & EAR INFIRMARY, Operative clinics.
- N. Y. INFIRMARY FOR WOMEN & CHILDREN, Results of operation in the aged, artificial menopause, operative gynecology.
- POST GRADUATE HOSPITAL, Urological diagnosis, functional diagnosis, cardiology, radiology, blood chemistry, dermatology and syphilology, traumatic surgery, obesity, diabetes, prostatic hypertrophy, G. E. diagnosis and treatment, pernicious anemia.
- RUPTURED & CRIPPLED HOSPITAL, Fractures, hernia, postural deformities, arthritis, paralysis of later life, physical therapy.

ST. VINCENT'S HOSPITAL, Dermatology and surgery.

UNIVERSITY & BELLEVUE CLINIC, Dermatology and syphilology, cisternal puncture, histological x-ray, grantz-ray, cryocautery and phototherapy demonstrations.

MIDTOWN GROUP

CANCER INSTITUTE, Cancer of female genitalia, cancer of the rectum and colon, cancer of the breast; cancer of male G. U. organs, radium and x-ray therapy, diathermy and radium therapy.

CENTRAL NEUROLOGICAL HOSPITAL, Arterial diseases of the brain, arthritis, cerebral hemorrhage, thrombosis, senile epilepsy, Parkinson's disease, the mechanism of sensory disturbances following lesions of peripheral nerves, senile chorea, senile tremors, the mechanism of sensory disturbances following lesions of brain, fractures, the mechanism and interpretation of pupil inequality in disease.

CITY HOSPITAL, Heart disease—the role of infection, hypertension, kidney disease, diabetes, arthritis, neurological conditions, gynecological conditions, genito-urinary disease, skin diseases, surgical problems—surgical intervention under regional and spinal anaesthesia, fracture of the hip, X-ray as an aid in diagnosis.

KNAPP MEMORIAL HOSPITAL, Operative and dry clinics.

UPTOWN GROUP

FIFTH AVENUE HOSPITAL, General medicine—pneumonia and interic syndrome, the coronary artery syndrome.

FIFTH AVENUE HOSPITAL, General medicine—pneumonia and infectious diseases, general surgery, general medicine—peptic ulcer, surgical specialty—G. U., surgical specialty N & T, surgical specialty—ortho., neurology, cardiology, syphilology, dermatology, asthma, anatomy and motor phenomena of the stomach, pathology of peptic ulcer, correlation of pathology roentgenology, pulmonary tuberculous, non-tuberculous chest lesions.

HARLEM HOSPITAL, Fractured skulls, pneumonia, eye examination, graphic records, diabetes, physical diagnosis, x-ray findings, rating, contagious diseases, practical diets, spinal puncture, standard treatment, diseases of the iris, nephritides, anti-pneumonia serum, cataract and glaucoma, exam. of cardiac patients, prognosis, intracranial hemorrhages, anoxemia, consideration of albuminuria, mitral valve diseases, hypertension neurology, oxygen chamber and its application in pneumonia, eye lesions, examination of cases, cardiac factor in hypertension, peptic ulcer, sickle cell anemia, cancer of gastro-intestinal

tract, cholecystitis, cholelithiasis and periduodenal cholecystic adhesions, parasitic anemia, albuminuria, etiology, biliary functional tests.

JEWISH MEMORIAL HOSPITAL, Arthritis deformans, lecture—hearing defects, lecture—relating to food in old age and longevity, lecture—operation risks, skin diseases, lecture and case presentation—uterus after menopause, lecture—constipation and allied disorders, clinic and lecture—endocrine glands, arteriosclerosis and senile gangrene, clinics or courses in rectal diseases.

JOINT DISEASE HOSPITAL, Arthritis, orthopedics.

LEBANON HOSPITAL, Prostatic hypertrophy, prolapsus uteri, endocrine disturbances.

MEMORIAL HOSPITAL, Organic changes—basis of tumors, medical problems in diagnosis and treatment of tumors, management of cancer of the breast, rectal cancers, adenoma and carcinoma of the prostate, neoplasms of genital tract in female, malignant bone tumors, cancer of the stomach, treatment of intra-oral cancer, special characters of tumors, diagnosis of cancer of breast, melanoma or melanotic sarcoma, cancer of the penis and bladder, neoplasms of genital tract in female, cancer of thyroid and lungs, leukemia and lymphosarcoma, care of patients suffering from intra-oral cancer.

MONTEFIORE HOSPITAL, Neurology—syph. & vasc. lesions of nervous system, pulmonary diseases, physiotherapy—technicalities and indications of methods, hypertension and arteriosclerosis, cancer—special reference to radiotherapy, nephritis and diabetes—lectures and presentation of patients.

MOUNT SINAI HOSPITAL, Arteriosclerosis and hypertension, cardiography, arrhythmias, gynecology, prostatic hypertrophy, physical therapy, skin neoplasms, tumors of the lungs.

PRESBYTERIAN HOSPITAL, Physical therapy (six one-hour lectures with demonstrations), heart disease, gangrene, hypertension and nephritis.

RECONSTRUCTION HOSPITAL, Physical therapy—arthritis, arteriosclerosis, high blood pressure, after-effects of hemiplegia and visceral disfunction.

ST. LUKE'S HOSPITAL, Operative and day clinics by surgical staff, ward rounds medicine, radiotherapy, otology clinic, operative otology.

VANDERBILT CLINIC, Skin diseases in the aged—atrophy, pruritus, eczema, pigmentations, keratoses and other precancerous changes, neoplasms, clinical demonstrations, therapeutics, pathology.

WOMAN'S HOSPITAL, Gynecology, radium and x-ray.

PAPERS DELIVERED AT STATED MEETINGS

Symposium: Factors that Produce Personality and Make for Personality and Behavior Problems, April 19, 1928

FACTORS IN THE INDIVIDUAL

WILLIAM HEALY

Director, Judge Baker Foundation, Boston

The rapid and immense extension of the service rendered by modern psychiatry has led the psychiatrist into difficult fields. Thirty years ago the physician who dealt with affairs of the mind had little else to do than face the problems presented by a few mental diseases that he then regarded as entities. Now, your psychiatrist working, to be sure, with the clinical psychologist, is called on to pass judgment and give advice about a tremendous diversity of social, educational, conduct and personality problems. Personality, that bundle of habits and attitudes that makes the individual a more or less integrated structure differing from others, is, above all things, the object of this modern psychiatric consideration. This huge subject of personality formation has been taken into the system of psychiatric science, if there be such a thing, or psychiatric art, at one gulp. There has been very little contemplation of what it might mean thus to swallow it, and it is still not altogether clear whether or not psychiatry is going to be able satisfactorily to digest and assimilate what it has taken in.

It appears by this time quite sure that psychiatry is going to find vast difficulty in satisfactorily dealing with what it has had thrust upon it for consideration, certainly some of the most complex material in all nature, unless it draws to itself for help in solution of its problems all that can be gained from other sciences, from anthropology, physiology, psychology, sociology. Above all, it dare not lose sight of the fact that human knowledge has received its greatest accretions through experimentation.

As it stands, we psychiatrists are much in the way of offering advice and making predictions partially by jumping at conclusions, without having much knowledge of a host of facts that we should have in our possession. We are somewhat in the same position as meteorologists: Not knowing all the forces at work, we accept at face value those that we do know about, and let it go at that, giving advice as best we can. Perhaps some five days ahead the weather bureau says fair weather is predicted for Easter, but aside from what is known of great atmospheric disturbances, experience shows that through not knowing all the factual background such predictions have a considerable chance of not coming true. We never read that the opposing currents and weather trends are such that the prognosticator says he does not know what is likely to happen. How is it with us? Do we often frankly say to the public or to the patient or his friends that we really don't know at all what will happen or what should be done at a given time? Some who are endeavoring to develop psychiatry as a science, and fortunately these are increasing in number, are willing to state in the individual case and assert for psychiatry as a whole that there is not as yet enough light to be even reasonably certain about many things. Our situations are infinitely more complicated than the weather man has to deal with and call for much greater discovery and evaluation of facts and much more modesty of statement. So while we may grin at half-baked weather predictions we can only deplore fulsome assurance on the part of members of our own craft.

Then I will dare to say that one of the most curious features of present-day psychiatry is the extent to which some particular theory or some one method of practice takes hold to the extent that emotional attitudes are evoked which preclude fair evaluation of what there may be in other theories and practices. Practitioners and the laity are equally caught in the toils. The basis for this I shall not discuss, even though there is temptation to speak

of the sales value of a foreign accent, nor need I give illustrations of the extremities of statement contained in various theories concerning the constitution of personality. It is, perhaps, enough to say that such a state of affairs is a mark of immaturity; psychiatry has not yet reached the point of developing itself mainly through experimental research. We are terribly behind other sciences.

And we must confess, too, that through our immaturity we have been willing to go to the public with a considerable overstatement and overselling of what we in our present development of psychiatry can accomplish. Not that this is altogether bad, at least according to our American customs and manners. Our great modern idea of advertisement, even though it involves some overstatement, gives the opportunity for a whole movement forward. As a result of it, psychiatrists in many newly established centers of clinical work are called upon for therapeutic accomplishment in vast numbers of cases, the like of which they never saw before and which they must become familiar with in order to advance psychiatric science. Not that there can be doubt about principles of treatment already accredited extending a certain distance in affording relief.

As for the bold statements of the several theoretical schools, they now exist in number enough and are so contradictory that not nearly so much harm is done as if psychiatry was under the sway of any single theory. Competition is promoting activity of thought.

Now nowhere do the complexities of what goes to make up personality become more evident than in the factors internal to the individual. But our growing knowledge and accumulating data concerning how the human individual is made up encourages us to believe that with the growth of our technic we may come to much greater understanding. Theories are bound to suffer; psychiatrists with only one viewpoint will have to get out of the way; those who are looking for explanations in line with the teaching of some simple formula will be discouraged. But putting together the facts already developed concerning the nature

of the individual himself, there is the promise of a stronger and finer future for psychiatry.

It helps us to see where we stand if we rapidly run over in mind representative names and associate a word or two of what they stand for in theories of personality structure and development. Let us pick the following: Galton and his idea of eugenic development of personality; Lombroso with his concept of physical perfections or defects standing as external symbols of personality tendencies; Max Nordau asserting that genius is allied to degeneracy; Morton Prince with his levels of multiple personalities; Janet with his psychological automatisms forming almost the completely reflex man; Freud; Adler; Jung; Kempf and his segmental stresses constituting the human personality; William McDougall and his instincts, emotions and sentiments; Birnbaum the hard-and-fast proponent of germ plasm as the creator of personality; John B. Watson; Kretschmer and the school which relates body build to personality and character; Koehler and the Gestalt conception of mental life; Hollingworth and his reintegration theory of how we think and are led into action; W. I. Thomas and the four fundamental wishes building personality; the endocrinologists wandering about in a jungle of ideas of what constitutes the hinterland of personality, having as yet been able to cut clearings in very few spots.

What an array of ideas concerning the factors internal to the individual which go to make up personality! And hardly any one has attempted so far to suggest a program for synthetic appreciation of what has been offered by these various thinkers. Perhaps better than anyone R. G. Gordon, the English psychiatrist, has essayed the task. In that well balanced book of his, "Personality," he takes into camp most of the theories mentioned above and, on the basis of the ancient dictum that a whole is always something more than the sum of its parts, he holds up for our consideration what he calls the "Emergent Personality"—something more than even a synthetic product.

When we even half review what is known of the structure and function of mental life and of its physical background, all as it is related to personality, we can but wonder greatly at the ease with which the exponent of some special theory explains personality and conduct trends. Here I would speak particularly to medical men of the way in which those of biological bent take a flying leap in thought from germ plasm to specific behavior. Nothing seems to me much more remarkable than this. The possible influences of later structural growth, of health and disease, of the many habits of the individual, of physical and mental experiences which may in potency vary according to the mood and condition of the individual, the growth of his mental life—all these things are waved aside with a magnificent gesture and we are told that the individual acts the way he does because some of his forebears had tendencies to behave in that way, or, at least, his behavior tendencies follow the pattern which somehow existed in his germ plasm.

But then, in extreme opposition we may consider the insistent enthusiasms of the behaviorist school and note their clear picturing of environmental fashioning as distinguished from any hereditary or innately fixed qualities. But can we doubt that the rabbit, that furry animal so regularly in the behaviorist's story, trotted out for the child to be afraid of, and then to be made unafraid of, represents too simple an objectification of the process of personality development. Is it not likely that there is very much more to the story?

Suppose we take an entirely different path, aiming, of course, at the same goal, the understanding of personality. Suppose we inventory the human individual, seeking in that way the factors that together with environmental influences go to form personality. Knowing that a whole manual could be occupied by the details (and we have such a manual in preparation), we may here speak of the method and point out some landmarks.

The physical self, surely this in its observable and measurable qualities and quantities is accurately known to be formative of personality. What shall we speak of particularly here?

We may well begin by mentioning strengths and weaknesses, for example, of the neuromuscular system, in whole or in part, saying nothing for lack of time of physical ratings in terms of robustness such as Pignet's index, or of the particular bodily forms, long and thin as against short and thick, that a small host of German and French writers have recently concerned themselves with. Nor may we discuss the organ inferiority theory of Adler which at times seems so attenuated. We need not depart far from common sense in stating in many a case that the individual could not have been at all what he is in personality if it were not for his particular strengths or weaknesses. And a curious anomaly presents itself when in a given situation, such as that of restricted city life, great strength and activity appear as a liability for socialized conduct output, rather than an asset. There are, too, many other implications unearthed by the study of the individual's physical powers.

Physiognomy: Not only, as Mantegazza says, does the human being inevitably imprint upon his countenance the marks of his emotional life, but from the years of childhood the cast of his features makes for self-appreciations or depreciations that are immensely formative, in turn of personality. Because of social response the individual sees himself perhaps wanted and attractive or perhaps despised and ridiculed. As we reported to a social agency who referred for educational and vocational advice a boy with a tremendously underslung lower jaw—the best possible investment, even vocationally, that could be made for a person with such a defect would be alteration of physiognomy. And do we not commonly speak of a noble brow, a commanding nose, a firm chin—recognizing that the possession of such features often implies a personality characteristic. And who knows, it may be the basis for that most unfortunate of attitudes, a superiority complex.

Physiological age: If through physical development or lack of development, the individual is out of step with the herd, this may be a prime source of personality problems. Many instances of such differences come to clinics where adolescents are seen in large numbers, and cases of this sort require serious attempt at adjustment in educational or community life.

Body mechanisms: The effect of posture upon personality development goes back to the James-Lange theory of the emotions, the bodily conditions being necessary concomitants of emotionality. To take a gross example, who can conceive of a depressed and melancholic state of mind existing when the head is erect, chest out, arms swinging free. To say that it is just the emotional condition that provokes the posture is to miss the point of our common expression "brace up."

The postural tensions of body and face that Kempf wisely makes so much of form another important item in the study of the physical attitudes and habits that form personality.

Perhaps we might mention also the subject of handedness, which is recently emphasized by psychologists and psychiatrists—the study of which is the preferred hand in various activities. This really has in some observed cases, under the conditions of social usage, proved to have very definite implications for personality; particularly when a child has thought of himself as peculiar or different on account of being left-handed.

It is not so long ago that we were making much of cranial contours, ideas left over from phrenology, and of stigmata, ideas persisting through the various theories of degeneracy. We can very well neglect here discussion of these as well as of the effect of certain diseases in the production of peculiar personality make-up (chorea, encephalitis lethargica, some cases of epilepsy, etc.) whatever the direct or indirect mechanism may be.

The point of these cursory statements in a review intended merely to be suggestive is that in the physical background of structure and function there is a vast amount that can be inventoried as belonging to personality.

Despite its overwhelming importance for consideration of the factors that form personality, I am merely going to call your attention in the most general way to mental life by giving some of the several categories under which mental life can be studied. The inter-relationships with personality can be considerably appreciated by this device.

We may take first the subject of the mental capacities of the individual. I am not so convinced that we know a very great deal about personality through knowing the Intelligence Quotient. I say this on the basis of some observed correlations between I. Q. and personality which have led to much feeling of insecurity about drawing conclusions.

On the other hand, the study of capacities in terms of special abilities and disabilities does often reveal the cause of particular interests, satisfactions, unhappiness, and through demonstrating latent possibilities of modification, challenges not only the geneticist but also the therapist who is concerned with personality development.

Next we may very well undertake the investigation of the questions of mental balance. You see, it is not only a problem of how large an engine you may have, as estimated, perhaps, by the diameter of its cylinders, but also it is a question of how well the parts work together. You see that here we are readily closing in upon the matter of mental or personality integration.

Then we may take up the mental and emotional attitudes which are specifically called personality characteristics. We inventory these under various heads and subheads, the main ones being: Social, dynamic, economic, ethical, emotional, intellectual, esthetic. And these traits or characteristics may be rated according to the various devices of

graduations on a quantitative scale or through bare antithetical description, the individual being courageous or cowardly, lazy or energetic, gregarious or asocial, etc.

Finally for our purpose here, we can mention the study of mental content, the main subject of the new psychiatry, whether it is studied as conscious mental life or what we may roughly designate as belonging to the unconscious. A slangy way of expressing it is that one studies what the individual has up his sleeve mentally. We know, if we know anything, that we are vastly made in our personality characteristics by our ideational life, by what remains over from earlier mental experiences of one sort or another and forms our world of ideas, good or bad. I constantly incline to the opinion that this matter from the personality standpoint, and especially as embodying constructive issues, is nowadays not half done justice to.

Material is easy to find illustrating the point of this given paper, namely the factors that within the individual produce personality characteristics. Here is a boy of twelve, not remarkably tall but with unusually large frame and exceptional strength, appearing very wholesome and strong. There is definite sex prematurity, and the boy's facial development is that of a much older individual. He has large regular features and a direct, pleasant and winning expression.

The problem for which this boy is presented is that he is repeatedly truant and for two or three years has been running away from home. He has made at least three sea trips, once as a young helper on a sailing vessel to the Newfoundland fishing banks. Mental testing shows nothing peculiar. He is a boy of good average general ability. It seems that various reasons have been given for this boy's behavior by those who studied him. He is said to have an oversolicitous mother, poor parental control and supervision, uneven discipline by his father, bad companions, jealousy of a younger brother, poor school adjustment.

But it finally comes out in this boy's case that the mother was born and brought up under frontier conditions, and

that her father was "an Indian Fighter." Here in the east she has fed this boy, since his earliest infancy, with tales of adventure. Digging into his mental life, one finds an immense amount of memories and phantasies centered on this. His father tells the objective fact that by the time he was three years old, he would run off and be found sitting by a railroad track. The boy tells us the subjective side; his earliest memories are of watching the trains and thinking how they might take him out there where men and boys ride and shoot. And that being too far to go he then took up with sea stories and ideas of sea adventure. The physical make-up, the mental content, both were needed to bring about the result.

But when we come to the end of our discussion of factors within the individual himself which make for the development or production of personality, we have to envisage the fact clearly that an immense amount of what goes on within the individual and an immense amount of his output in behavior, conduct, activity, or whatever you want to call it, is merely response to the situation, the environmental situation. The inter-play with environment must be one of the main subjects always in the study of personality development. Studying a fish out of water, without knowing the properties of the water and what it does to the fish, and what the fish does to the water, was the method of an early and immature zoology. But it carried human knowledge a very short distance indeed in biology, and no farther than a study of personality apart from environmental influences, and apart from responses back and forth, will carry us.

Much of personality studies, so far, perhaps because they have been so largely developed by psychiatrists, is imbued with the pathological standpoint. Discussions of disadvantages and contemplation of unfortunate conditions and situations, have for the most part commanded the view. It is so often forgotten that our assets, special abilities, superiorities, all of course, go to form personality and its variations as much as disabilities and inferiorities

do. One notes exactly this shown distinctly in even such a publication as Chassell's Inventory for the study of the variable factors in experience contributing to the formation of personality. Perhaps this is only natural, since attention is first drawn clinically to problems that need solving, rather than to personality conditions that seem good enough. But we must take a leaf from the book of science, particularly medical science, and realize that while the first call for aid comes through observation of pathological conditions, a step forward that soon has to be taken is towards understanding physiology and the normal, over and beyond pathology and the abnormal. And the latter can only be well understood, after all, in terms of the former.

And there can be no doubt that our prime interest in the study of personality, as in other sciences, is control of the situation, that is, possible modification of personality. And as we consider this point, we are forced to discern that we are immensely lacking in observations and experiments upon changes in personality and the potentials of change. Having observed myself a few utterly unexpected and apparently immense changes in personality under conditions of treatment offered, I say that I wonder why we, any of us and many of us, do not concentrate upon the development of scientific effort in this matter. Probably the trouble is the quantity of grist that comes constantly through our mills, but I am inclined to believe that perhaps it is the lack of recognition for the need of deeply considered experimentation.

A wide synthetic approach to the problems of personality would include all that I have sketched in bare outline and more too, as we derive more facts in the struggle for truth in the biological and psychological fields. We are seeing nowadays some beginnings of experimentation concerning human nature, only beginnings, however, because of all things the study of human nature has been so neglected in the development of scientific method. To take account of all we know, as well as to hope for greater knowledge, is certainly the part of wisdom in passing upon the

causative factors of the make-up and the output of the human personality, either by way of etiological explanation or consideration of possible modification and control of personality and behavior.

All this may seem a formidable task, but so far nothing like the intricate technic of such a science as physics is involved. And a more comprehensive outlook upon the complexities and inter-relationships of all the structures and forces that go to make personality is indispensable. A cheaply wrought effigy of human personality will, with the passing of time, provided there is progress in human thought, prove a flimsy structure, so unsubstantial that it will topple and decay and prove to be of value only if looked at from some narrow angle.

II.

ENVIRONMENTAL INFLUENCES

LAWSON G. LOWREY

Director, Institute for Child Guidance

Dr. Healy has already indicated that in the evolution of personality and of personality difficulties, we have to consider not only the individual with whom we must deal, but the way in which that particular individual develops to the point at which we study him. Further, that in this process of evolution or development we have to deal not only with our original human material, but that, since it is a plastic type of material which is constantly reacting to situations which arise, and in turn is affecting those situations, there is a constant process of modification, dependent not only upon the underlying native innate growth impulse, but also on the experiences to which the organism is subjected.

It becomes my task to attempt to make some analysis of these environmental influences which help to determine personality and personality difficulties, and try to show some of the ways in which they operate.

We have been accustomed to speak of the environment as though it were something rather fixed and immutable and at all times exactly the same. I should plead for a change in thinking, so that we would come to speak of environments and recognize the point that every individual is constantly being exposed to a wide variety of environments and, therefore, of environmental influences. Furthermore, it seems to me that we have tended to make the mistake of visualizing any environment—for example, that of the home—as one which is a continuously unchanging one. Frequently we hear even medical men in discussing the problems of the personality of children (their own, their neighbors' or their patients')—make the point that "these two or three children are totally different, yet they have had throughout their life exactly the same environment."

Suppose we stop and analyze that statement for a moment. If there are three children in the family the chances are that the parents are some years older when the third child was born. To assume that those parents are the same when the third child comes is to assume that they are utterly incapable of learning by experience, of developing in their relationships to each other and in their relationships to their children, or of increasing their income during this period so that greater advantages can be provided. Indeed, it would tend to give us the impression that with developing age and greater experience there are no changes in personality reactions. That we know immediately is absurd, because one thing is certainly true—that whether progressing or regressing the personality and the behavior of individuals change with age. The man at forty is usually a man with very different ideas and very different kinds of reactions than he was at twenty to twenty-five. As I said before, the change in reactions may be a regressive one, rather than a progressive one. But it is rare, indeed, to find an individual who is so fixed that there is no change in such a long period.

Therefore, it seems to me that what we need to do is to think of environments, not in terms of their static physical

qualities, but in terms of the dynamic aspects. We cannot, of course, in working on the problem of environment exclude the static physical aspects, because there are factors in such things as food, air, water and shelter which have a relationship to the reactive capacity of the organism. We cannot, therefore, eliminate them. Some kinds of physical environments are unhealthy; some are healthy, etc.

But so far as personality and behavior in particular are concerned, the important issues lie in the dynamic aspects. When we consider the dynamic aspect of an environment we come immediately to the question of the personalities who make the environment what it is. After all, it is the viewpoint, the attitudes, the behavior, or the ideas of the parents in a home that go so far towards determining what the relationships there shall be, and thereby determine the atmosphere of the home as an environment. Here are found the stimuli to which the child must react.

So it is in school. School rooms are, I suppose, to most of us, not very pleasant places to think about, and most of us have reactions about the curriculum in the schools and about the kind of drilling that is done there, and about the over-regimentation of children that is occurring with the increasing masses of children being educated. But after all, when we come to an analysis of the stimulation of behavior and to personality development in school, we find that it is the teacher and the pupils with whom the child associates, who constitute the really dynamic stimuli to be found in that environment.

We have been very much interested in the attitudes of teachers towards behavior in children over the last several years. Our interest was most stimulated by a situation which arose when we were studying the behavior problems occurring in a supposedly normal group of children in an average school. In one room we had asked the teacher to give us the names of her most serious behavior problems, and she said, "but all my pupils are behavior problems."

On further questioning, she pointed out the three who were the most serious problems.

In talking over their situation with these three children they were asked, as all children are, whether they liked the teacher and whether the teacher liked them. The illuminating thing was that all three said they were the three boys in the room whom the teacher liked the least and each independently of the other ranked themselves in the same order of her dislike.

Here, then, came to the surface a profound understanding on the part of these children of what the teacher's attitude was. In inquiring from the teacher we found that they had rated themselves correctly. And then we tried to learn why all the boys in the room presented behavior problems and why her dislike for these boys was so obvious to them. We discovered the following very simple and very homely facts, but extremely important. She was not very well and had not wanted to teach that year, but for economic reasons at home it had been necessary. Having to teach, there was one grade that she preferred not to teach, the third grade, yet she was given the third grade. Particularly she had requested that whatever grade she taught, she be given a section in which there were no boys, because boys were extremely irritating to her. Still, she got a room in which there were only boys. So that every single factor that might conspire to make her feel unhappy and insecure in her job, and irritated by the daily pressure of it, had come to bear on that one room. Hence, we believe this relatively serious situation developed as a direct result of her own moods and reactions.

That is a very simple and a very homely tale. But I maintain that it is important, because it shows how profoundly influential the attitude of the teacher may be with respect to the behavior and the personality traits of the whole group of children in her room.

Since then we have been studying teachers' attitudes. I hesitate to speak much about it in advance of publication

but a book is coming out shortly that has to do with this whole question of teachers' attitudes. We have obtained from 700 teachers their idea of the seriousness of behavior problems that they encounter from the standpoint of the future of the children.

In relationship to the case that I am going to cite a little later, I would like to point out particularly that the problems which they see as serious are chiefly problems in obedience. The disobedient, impudent, forward, fighting, struggling type of child, they believe is very seriously hampered for his future. On the other hand, they do not regard the quiet, submissive, timid, seclusive, unsocial day dreaming type of child as presenting a very serious problem from the standpoint of the child's future.

Give the same list to psychiatrists and they reverse the order of seriousness and feel that the disobedient, impudent, forward, fighting type of child at least has assets of energy and of ambition and certainly a capacity to fight for himself which will be very helpful to him in his later struggles to adjust to life. But the seclusive, unsocial type tends to develop within himself and not in social directions, so that he is hampered in his life struggles.

Again companionship, whether it is in the home or in the school or outside, provides a powerful series of stimuli towards the development of personality and behavior traits. All sorts of things happen in the companionship of children of which adults are not aware, whether it is because they don't want to be or not. I am not sure. All kinds of experiences may come in which make for very serious difficulties in the youngster's viewpoint of himself. Such items as sex play developing even in very good neighborhoods may set up various types of emotional reactions in the children which come to expression either later in personality abnormalities, or in behavior difficulties.

Oftentimes the parent, somewhat apprehensive that sex play may creep in, has a notion that the children have been carefully watched and that nothing of the sort can happen.

Yet one of the most serious situations I can remember going through was one in which a small girl had spontaneously told a story of a large amount of sex play in the neighborhood, had been advised to talk it over with her mother, was afraid to do so, and told the mother that the doctor had accused her of a lot of sex activities which she, being frightened, had admitted. Fortunately, that mother had enough confidence in us to bring her anger back to us, and to point out just how terrible was the work we were doing in thus accusing the child. Had that not been done one does not know what might have happened in the relationships between the girl and the mother. There are so many factors in companionship as I said before, whether it is in the home or outside that it becomes a little difficult of brief analysis.

I should like to draw attention to one or two very important factors quite frequently overlooked. The first of these is jealousy between children in the same family. Probably no child succeeds in completely eliminating jealousy of the other children in the family. There are many adults who are quite certain that never as children did they feel any jealousy of the other children. But it is usually quite clear that they did from something they then proceed to say respecting the brother or sister, as the case may be.

This factor of jealousy leads to a great deal in the way of behavior designed usually to draw the attention of the other members of the family away from the other child. It is probably more potent in the production of behavior disorders than it is in the production of personality, although concerning this one cannot speak with too much assurance. Particularly at the present time when our ideas of personality are so extremely poorly expressed, and what we are actually talking about most of the time is really the behavior that an individual shows, relating it in some obscure fashion in our own thinking to some vague kind of underlying personality trait.

Furthermore, there is another issue that comes here, which probably should not be discussed under companionship, but it is very important—the dislikes that parents have for their children. Here again, very few parents will admit that they dislike their children, or a given child. Actually, of course, all parents are ambivalent about their children. There are a few who are inclined to think that their children are absolutely perfect, but even so, they will usually point out something that the child does which they wish he did not do.

You might quite logically object to having this spoken of as dislike, when they object to something in the child. I would point out, however, that it means that the child is not totally accepted as a perfect being, and that it is only a step from there to an active type of dislike and rejection.

These dislikes, these jealousies within the family impose upon the individual a considerable burden, usually in terms of a feeling of failure or insecurity in the group. To carry this feeling outside the home to the competitive circle in the school or in the neighborhood, is merely to extend the range and the number of different types of things concerning which failure or insecurity in the group may be felt.

It seems to be one of the outstanding lessons of the intensive study of the child that one of the things which is absolutely essential for the development of normal types of emotional reaction and normal types of behavior is that the individual should have a feeling of security in the group. Indeed, there is no reason to restrict this to children. It is equally true of adults and has very profound influences on their behavior and personality reactions. Changes in their feelings of security are among the important reasons why some adults apparently undergo quite definite changes in personality with no specific reason to be assigned. It will frequently be found that this has to do with their feeling of an ability to react satisfactorily to these dynamic stimuli which come from the environment.

I have sketched very inadequately some of the dynamic elements in the environment and some of the important things that may happen. It has occurred to me that a brief analysis of one of our recent cases may be helpful in illuminating the point of view. This boy at the present time is nine years and eight months of age, and is in the lower fourth grade in school. He is living in a protestant institution for children, and attending public school. He presents the following problems in behavior and personality. He is extremely slow about anything that he is asked to do. He is extremely dirty and untidy. He has been known to wash his face and come and present it as clean and have to be sent back to wash it again. He always loses his things. He is very absent-minded and forgetful. He does not remember and obey orders. When he is given a task to do he stands and day-dreams instead of working. He spends a great deal of his time in day-dreaming, interrupting almost any kind of process to gaze vacantly off into space. He is doing poorly in school, not quite failing work, but almost. He does not play with any of the other boys. He spends a great deal of time reading and usually reads the books that the older boys enjoy at this place. His one recreational outlet is chess, at which he is said to be quite good.

The other boys do not like him. They tease him and throw him out of their group. He does not seem to be interested actually in their sports and makes no effort to go ahead with them.

We have this picture then of what anyone would call, I think, an introverted personality; seclusive, unsocial, no one to whom he confides, no one who really knows what is going on in his mind, very much wrapped up in himself, evidently finding great outlet in phantasy life.

Now the question is, how did the boy get this way? Have we to do here with an inherited type of personality defect? Have we to do with a constitution which could not develop in any other way? What is it that is happening? It seems to me that we do not know, and that we have no way

of knowing, but in trying to work out his situation we find some very definite things that must have contributed to the production of the problem.

He is the fifth child of a pair of very immature parents, even at their present age, who were divorced when he was eighteen months old. The parents did not want this child; they had enough already. The father was already drinking very heavily and wandering away from home from time to time, and eventually deserted the family, so the mother divorced him. From the time the boy was eighteen months of age until he was eight he lived with his grandmother. She apparently had no other outlet for her interests and emotions and ambitions. She was a widow. She did everything for this boy, so he never had to do anything for himself. She always picked up his clothes, washed him, dressed him almost until the time he left her home, which he did at the age of eight for a reason which is not clear. That is to say, we don't know what happened at this particular time.

During all of this earlier portion of his life he was the center of an enormous amount of attention and received an enormous amount of affection. There was no reason why he should learn to do things, as there was some one else to do them for him.

The development of these behavior traits which are now complained of, would seem to me inevitable. He had no companionship anywhere near his own age, chiefly his older brothers, who were apparently resentful of the amount of attention the grandmother gave him, so they proceeded to tease and pick on him and drive him out of their games. Increasingly, he became a solitary person with one human outlet, his grandmother, and no other.

Then he was moved, and after a very few months came to this institution in which he is in with a large group of boys, most of them stronger and abler than he; and there he gets no sort of recognition or attention or affection at all.

He is doing, as I said, poor work in school, yet we find that he is a lad of very superior intelligence, who is quite capable according to the educational achievement tests of doing at least high fifth grade work, whereas he is classed in low fourth.

He has been a sickly youngster all his life. He is now the asthenic type with a very bad posture, flat feet, knock knees, painful knees, so he walks with a very stiff gait, and can do very little athletically. He could not run, I suppose, at all. He has very badly infected tonsils. He probably had several mild attacks of rheumatism which explain at least some of his difficulties. He is very susceptible to bronchitis, influenza and pneumonia. There is here the picture of a youngster who cannot put himself over with his group through his physical activity; whose intellectual ability has never been recognized so he could put himself over in that way; whose social habits have been so poorly formed that he cannot get praise or attention in that way, and who has lost the only source of emotional security he had, namely, his grandmother. Now, is it not a fair question whether all of these stimuli from the environment, piling up as they have, are not far more important in the determination of his present personality and behavior trends than whatever his underlying biological constitution may have been? Certainly from the standpoint of any treatment program we have to take these as the dynamic situations with which we can work in the attempt to alter his behavior. And I believe it can be demonstrated in a good many cases that with alterations in behavior, there develop alterations in underlying personality tensions which determine that behavior and hence we might very well say alterations in the personality itself. Accordingly, these environmental factors in the production of personality trends and behavior disorders seem to me of overwhelming importance if we are actually to understand and mold personality.

THE FUTURE OF SURGERY

WALTON MARTIN

When your Committee assigned to me as a subject "The Future of Surgery," (and I should like, at the outset, to make it clear that the subject is not of my own choosing), I set about thinking of the various methods used in prophesying. I thought of the forecasts of the Weather Bureau, the exact predictions of astronomers, the extravagant prophesies made haphazard by story tellers, often curiously accurate, and the cautious guesses regarding future happenings made by the students of the past, suggestions of possibilities rather than predictions. It seemed to me that one might arrange the methods in three groups: the scientific, the romantic and the historical.

Knowledge gained by observation, arranged systematically, the painstaking study of the relations of these observations, the setting down, to be remembered, coexistences and repeated like sequences, belong to the scientific method. Making hypotheses which fit the succession of happenings, the testing of these hypotheses so as to establish them as theories and the appreciation of the rightness of these theories by their yielding confident forecasts, practical experience proving them to be sound time after time, also form part of the scientific method. A chemical reaction, the occurrence of an eclipse, are examples of prophesies fulfilled. For prophesy is a legitimate outcome of the scientific method. It implies an accurate knowledge of all the conditions and a narrow field of investigation.

In the second method, which, for want of a better name, I have called the romantic because it is not infrequently found in tales in which the incidents are remote from every-day life and experience, the prediction is but part of the fiction. If by chance there is any faintly similar occurrence years afterwards, the story is looked on as prophetic. Such are the tales of Jules Verne: "Forty Thousand Leagues Under the Sea" or "Round the World in Eighty Days" or the journey to France by airship of Mr. Ponderevo in "Tono-Bungay" by H. G. Wells.

At times, however, unhampered by a story, prophecies are thrown out in pure exuberance of fancy. If the writer is trained in a branch of science and the imaginings are confined to his special field of inquiry, the prophecies are always interesting and stimulating. They seem most real, however, I think, to those least familiar with the particular branch of knowledge in which the writer is a specialist, for knowledge breeds scepticism, inculcates caution, makes one conscious of the difficulties of accomplishment. A forecast of Mr. J. B. S. Haldane, a reader in biochemistry in Cambridge University, is pertinent. In an essay called "Daedalus, or Science and the Future," read in 1923, after referring to an extraordinarily accurate prediction on the use of airplanes in warfare made by H. G. Wells in a book called "Anticipations," he goes on to say: "I propose in this paper to make no prophecies rasher." He then predicts the production of ectogenetic children, one hundred years from now. I cannot refrain from quoting from the paper on the influence of biology on history, supposed to be written by a rather stupid undergraduate during his first term in the year 2073: "Dupont and Schwartz obtained a fresh ovary from a woman who was the victim of an aeroplane accident, and kept it living in their medium for five years. They obtained several eggs from it and fertilized them successfully, but the problem of the nutrition and support of the embryo was more difficult and was only solved in the fourth year. Now that the technique is fully developed we can take an ovary from a woman and keep it growing in a suitable fluid for as long as twenty years, producing a fresh ovum each month, of which 90 per cent. can be fertilized and the embryos grown successfully for nine months, and then brought out into the air. Schwartz never got such good results, but the news of his first success caused an unprecedented sensation throughout the entire world, for the birth-rate was already less than the death-rate in most civilized countries. France was the first country to adopt ectogenesis officially, and by 1968 was producing 60,000 children annually by this method." I know no better example of the romantic method.

The last way, the historical, does not attempt prophesy. It studies the records, the papers and the succession of textbooks and attempts to make out the gradual unfolding of any branch of knowledge or any art. It investigates the past and works out from it the trend of the present; it makes no bold speculative inductions, the sketch of coming time is roughly indicated, not sharply drawn. This method seems to me best suited for the study of the future of the art of surgery. I shall begin, therefore, with a retrospect of surgery. I shall attempt to find suggestions of the future by looking back on the records of the past.

In the first chapter of the tenth edition of "The Science and Art of Surgery" by Sir John Eric Erichsen, written in 1895, it is pointed out that there cannot always be fresh fields for conquest by the knife, there must be portions of the human frame that will ever remain sacred from the hands of the surgeon. "When we reflect," he writes, "that every large artery in the body up to the aorta itself has been ligated, that each of the six large articulations and many of the bones have been resected, that amputation at the shoulder or hip is a matter of ordinary occurrence, that tumors have been excised from every region of the body, that the larynx, the spleen, the kidney, the pregnant uterus and even portions of the liver, stomach and brain have been successfully removed, we can scarcely doubt that the limits of Surgery have been nearly reached."

"But if," he goes on to say, "the mechanical Art of Surgery has attained to so high a degree of perfection that we can scarcely hope for much further progress in that direction, the case is widely different with the Science. Here truly, so far from having approached the limits of our subject, we are but as yet on the threshold. For whether we regard the Science of Surgery in its relation to the essential nature, the pathology and the diagnosis of surgical disease and injuries, or whether we consider it in reference to all those circumstances which, independently of the mechanical skill of the operator, influence for good or for ill the results of his procedures, we have a field before us the extent of which it is difficult yet to estimate."

The first part of this prediction has been often quoted in papers on the "Future of Surgery" to show how wrong Erichsen was. Yet I venture to quote it in its entirety as essentially correct for the thirty-three years that have passed since it was written. The third of a century, or a generation, about the time that I have been able personally to follow the development of surgery (the ninth edition was one of the textbooks I used when a student in medicine) has again shown that the advance of science has produced the advance in surgery. Erichsen's qualifications for making such a statement on surgery were unusual. The first edition of his book appeared in 1853. He writes that it represents the substance of lectures on surgery delivered at University College since his appointment to the Chair of Surgery in that institution. He was appointed in 1850 and Lister was his house surgeon the following year. On December 22nd, 1846, he had been present at the first public operations on patients anesthetized by ether. Lister saw the same operation as a first year student. By the time the eighth edition appeared, thirty-one years later, in 1884, he could write of the antiseptic methods introduced by Lister and "founded on the experimental researches of Pasteur." He was writing and teaching surgery when two of the discoveries that have most influenced it took place.

Erichsen distinguished sharply between the art and the science of surgery. I think this has led to some misunderstanding. Neither the past of surgery nor the future can be discussed without an attempt to make clear the relation of allied sciences to surgery and to discuss whether one can even speak properly of the science of surgery. During the forty years that the various editions of his book were used as a textbook in England and America, it was published under the title of "The Art and Science of Surgery." He had always in mind that there was something more in surgery than manual dexterity. He writes: "A great surgical operation, in its conception, performance and its completion, tests the operator's medical knowledge as much as and in as varied a manner as it

taxes his manual skill." By the Science of Surgery he evidently meant what he rightly refers to in this sentence as medical knowledge, the notions of the etiology, exact notions not only of the morbid anatomy and the morbid physiology of the condition but of the patient he is treating. Surgery, if you will, is an applied science. Erichsen himself, in one place calls it a scientific art, but for most of us it is essentially a practice, a way of treating disease. When Iago asks Cassio if he is hurt and Cassio replies: "Aye, past all surgery," he is thinking, not of any systematized knowledge, but that he is so badly injured that he cannot be repaired, he is broken past mending, even if it is only his reputation he is thinking of. Since Shakespeare's time it has always been used in this sense. In the large Oxford dictionary the only definition of surgery is "the art or practice of treating injuries, deformities and disease by manual measures." To be sure there is an element of science in every art. But have we not all a vague understanding that science has to do with knowing and art with doing?

The surgeon, if you will, is an artizan, a handicraftsman. His handicraft is influenced largely by classified and systematized knowledge, verified by repeated clinical observations and checked by research and experiment in a variety of closely allied subjects, but outside this he is dealing with things incomplete and uncertain, things he learns only by experience. He belongs in a group with the farmer, the carpenter, the builder and the navigator.

One skilled in guiding vessels over the seas into distant harbors determines his ship's position by geometry and nautical astronomy, but seamanship is necessary. He must have an eye to tides and variable winds, floating icebergs and shifting sandbars. Thus it is with the surgeon; he must practice his art under changing circumstances and in conditioning environments often imperfectly understood. The various sciences he uses are shared with the medical practitioner, just as the navigator shares applied geometry with the surveyor and the builder. It seems to

me, in studying surgery in the past or in attempting to determine its trends in the present, it is a mistake to divide it into an art and a science. It is clearer to think of it as a practice and to speak of the technique and the fields with which it is occupied. Surgery is concerned with a group of disorders which the state of medical knowledge, at any given time, believes to be most advantageously treated by manual measures.

I shall therefore consider the technique of surgery and the field of surgery and attempt to show how they have been modified since Erichsen's time and how we may expect them to be modified with the understanding that the two go hand in hand.

Every art has a technique, a mode of execution, a special skill in working out the desired end and this special skill is dependent largely on the congenital aptitude for the work in hand, on apprenticeship and on opportunity.

Each one of us is born with slight differences in makeup, our natural propensity varies, our ability to do things. A man is born with a hand that does things easily and skillfully, just as he may be born with an ear and a brain that can distinguish fractional differences in wave lengths of sound, and a man comes into the world with unusually delicate muscular sense, that sense which registers in the brain the stress or strain which is being exerted. There are wide variations in visual memory. If two boys without training are set down before a clock and asked to take it down and set it up, one may do it far more readily than the other. Both will probably easily take it apart, but one has seen in his mind's eye so accurately the relation of each part as it was taken down that he can put it together again without difficulty. The faculty of acting well under unexpected circumstances, a certain coolness and absence of flutter and agitation when acting in an emergency, seems to be more marked in some children than in others. A certain rapid and accurate appreciation of the relative value and probable sequence of things, an intellectual grasp of the group of all the attendant circumstances, what

we call sagacity or mother wit, is far more marked in some than in others and seems altogether independent of cleverness in books and a facility in solving set problems.

Deftness, muscular sense, eye memory, self-possession, presence of mind and common sense, are all qualities especially valuable to the surgeon.

We are concerned with whether or not they are all to be more marked in the future and whether, as we look back, we find any evidence that these qualities were less developed. The whole trend of modern teaching points in one direction. Paleontologists, anthropologists and historians give one answer. They all show that biological development has nearly stopped or is too slow to be appreciated in the historical period. Looking back on the long stretches of time since man first began to make tools, makes us realize that Hippocrates and Galen are our contemporaries. We have not the slightest reason for thinking that children born to-day or that will be born to-morrow are defter, better natural workmen than those in Athens five hundred years before Christ, or the goldsmiths, architects, sculptors, painters, workers in stone and carvers of wood living in Florence in the fifteenth century.

Aside from inborn fitness for any art or craft, there is the question of training and opportunity. The natural variations in the characteristics we have enumerated give us such a wide range in the combination of qualities that the average man is within the range of a skilled worker, provided he serves an apprenticeship and provided occasion is given for the carrying out of his craft. One might make a rough guess that five per cent. of the house surgeons that one remembers were congenitally unfit for the task and that five per cent. have shown such an unusual natural endowment that, with practice and opportunity, they were generally recognized as destined to be outstanding figures, but that ninety per cent. have sufficient natural capacity to become competent surgeons with the training and the chance. The ordinary builder, plumber, carpenter, and painter that one sees is good at his trade, not because

he is exceptionally gifted, but because he is exceptionally trained and has unusual opportunity to work at his trade. As Emerson said in his essay on "Power," practice is nine-tenths. Initiatory training, the setting to work assisting and carrying out under direction gradually more and more difficult tasks, doing over and over again the various technical procedures till they sink into the subconscious and become reflexes, and an opportunity to work day after day, are indispensable in the attainment of skill in any of the arts and crafts. If we have little reason to believe in a change in natural capacity, we have convincing proof that there has been a gradual increase, both in the opportunity to do surgery and in the opportunity to learn its art as an apprentice. The most casual glance at hospital records shows an extraordinary increase in the number of operations during the last thirty-three years. The costly and elaborate technique necessary in modern surgery is gradually throwing all surgical work into hospitals and clinics. More and more, the surgeon will operate where he does it to the greatest advantage. The ease of communication, the drift of the populations toward large centers, are tending and will continue to tend to take the sick to the surgeon rather than the surgeon to the sick. This tendency has acted and will act to give not only increasing opportunity to do surgery but to learn surgery. There is every reason to suppose that surgery, throughout the world, will surely and slowly advance technically. The widespread and growing disposition of groups of workers, from different parts of the same country and from far off countries, to watch surgical procedures, not in amphitheatres as formerly, but over the shoulder of the operator, makes for uniformity. The surgeon of the out-of-the-way places (and the time seems approaching when there will be no out-of-the-way places), sees and copies the work done in the great clinics and centers of surgical activities. In the future one would expect not so much a development of a few with extraordinary facility, but a great increase in the number of those who are considered highly skilled.

By 1895 the introduction of anesthesia and the knowledge of the relation of microorganisms to wound infection had made surgery relatively painless and relatively safe. The knowledge of anatomy had advanced to a stage when the naked eye appearance of the various structures and organs had been accurately described and correctly represented. The various operative procedures worked out on the cadaver for the ligation of vessels, amputations and disarticulations, are described accurately in Faraboeuf's Manual, published in 1895. The completion of this Operative Surgery by the prosectors of Paris, published in 1904, including operations on the various organs, gives a description of most of the procedures in use to-day. Forty-two years ago Billroth reported fourteen cases of the excision of the pylorus and modifications of these procedures are still used. The open treatment for fractures and the introduction of plates for holding the fragments was discussed and warmly advocated in the Ninth Congress of Surgeons, in Paris, in 1895. Twenty-eight years ago a report from Krönlein Clinic in Zurich on the end results of operative treatment of twenty cases of exophthalmic goitre, including ligation of the vessels, resection and enucleation, was published. The patients had been operated on between the years 1888 and 1900. In 1895 Ssabanjew performed the first embolectomy, removing an embolus from the femoral artery. By 1910 portions of the hypophysis had been removed fourteen times. All these reports, however, show a far higher mortality than at present. The thyroidectomies showed a mortality of 8.6 per cent. The mortality in nephrectomy for tuberculosis was over 30 per cent.; today it is 2 per cent. Billroth reported eight deaths and six recoveries in pylorotomy; three years ago Balfour reported 46 partial gastrectomies with one death. We could go on multiplying examples.

The advance has not been in new procedures but in perfecting old procedures, in refinement in technique and in lessened mortality. With a gradual increase in the number of patients, with increased opportunity to perform

operations, there has developed increased skill and, with increased skill, lessened mortality. With lessened mortality more patients have come to the surgeon. A favorable circle has been created during the last thirty years.

Another factor, aside from relative safety and relative painlessness, that has brought about the increase in surgery, is increased accuracy in diagnosis. The surgeon is essentially concerned with what he can see and feel. The visible field has been largely increased, especially since 1895. In days when there was uncertainty whether or not a stone that was supposed to be causing symptoms would be found, it was but natural that there should be reluctance to submit to attempts to remove it. Three hundred and fifty years ago, Montaigne was complaining that "a gentleman in Paris was not long since cut for the stone, in whose bladder they found no more stone than in his hand."

Toward the end of 1895 the discovery of a physicist, Röntgen, and the developments arising from this discovery, introduced into medicine a most valuable diagnostic method.

In 1879 Edison invented a lamp with a carbonized thread for a filament, sealed in an airtight glass tube. Within a few years the cystoscope, the esophogoscope, the proctoscope and the bronchoscope had come into use. The perfection of these and similar instruments since 1895 again offers an increased field of exact observation. Accuracy in diagnosis has contributed largely to the confidence of the medical practitioner and the general public in surgical work, and modern surgery is built on this confidence.

One may say that surgical technique has now advanced to the point where any structure in the body can be exposed, inspected and manipulated. With the perfection of skill there has been a perfection of instruments, appliances and media. The science of chemistry will undoubtedly furnish better local anesthetics and antiseptics. It seems

highly probable that among the endless synthetic compounds some will be found less poisonous and more powerful than any that we now possess. The trend as recorded seems to indicate lessened risk from infection and lessened risk from induced anesthesia and, with the latter, a distinct increase in the use of local and regional anesthesia. As the limit of absolute safety is approached a slower and slower advance is to be expected.

The field of surgery presents a different and a most interesting problem. It has changed and will certainly change. The disorders turned over to the surgeon from the earliest times have been injuries, congenital malformations, acquired deformities, foreign bodies and concretions, certain phases of the defense reaction of the body to infection, and the removal of accessible tumors. There has been added in recent years an effort to control and regulate function by mechanical means.

One may say with reasonable assurance that congenital malformations, hernias, cleft palates, pilonidal cysts and branchiogenic cysts and sinuses, congenital pyloric stenoses, Meckel's diverticulum, patent urachus, exstrophy of the bladder, etc., will come to the surgeon as they have in the past for rectification and repair. Each year, for reasons we have already referred to, more of these deformities will be turned over to the surgeon.

It is interesting to speculate on the number of injuries in the modern world, in the world of the past and the world of the future. Were more men kicked by horses, thrown or run away with than are smashed by motor cars, hurt in railway accidents and disabled by modern machinery? Will the wider use of the airplane, with diminished hazard of collision and added hazard of falling, increase or decrease the number injured? One can only make passing observations. In a country with prohibition in the constitution, in one small park in a large city, two lamp posts a week are destroyed by motor cars in head-on collision. I believe injuries in proportion to the population are increasing, not decreasing; that the curious tendency to

crowd closer and closer together in urban centers and to use more powerful and swifter moving machines is accompanied by largely increased risk of injuries. The surgeon of the future will have more, not fewer injuries to treat.

Is warfare to be more or less destructive? The perfection of guns, projectiles and explosive substances seems to suggest but one answer. In Captain B. H. Liddell Hart's little book on "The Future of War," he points out that, by a curious combination of sentimental pacifists and traditional militarists, the most merciful weapon yet devised has been outlawed, namely, poison gas. "Even with the lethal gases of the last war, the use of which was decried as barbarous by conventional sentimentalists, statistics show that the proportion of deaths to the number temporarily incapacitated was far less than with the accepted weapons, such as bullets and shells." He quotes the views of a high German authority, General von Altrock: "In wars of the future the initial hostile attacks will be against its large cities, factory centres, munition areas, water, gas and light supplies. Discharge of poison gases will become the rule. Entire regions inhabited by peaceful populations will be continually threatened with extinction." Captain Hart's conclusion is that the weapon, the target and the aim will alike be civil. The work of the surgeon in war may be largely in the civil hospitals.

Foreign bodies and concretions in the ducts of glands fall to the surgeon. Is the time coming when a knowledge of the chemistry of secretions will be sufficient to prevent the formation of calculi, or will a synthetic drug be discovered with solvent action on the constituents of stones? It is possible, but the factors entering into their formation are so complex, the part played by infection and even possibly by the congenital peculiarities which tend to produce stasis is so imperfectly understood that it is conjectural if, for years, there will be a better means at our disposal than to remove them when they have once formed.

The surgeon, from the earliest times, has opened abscesses and removed infected foreign bodies and necrotic tissue. He learned empirically, at least two thousand years ago, the efficacy of these measures. The better understanding of the nature of infection led for a time to the radical removal of all centers of infection. There was a period when primary chancres were cut out, anthrax pustules widely removed, secondarily infected glands excised and incisions made in erysipelas. If pyogenic infection progressed it was assumed that the cuts were not long enough or deep enough. The trend of opinion in recent years, guided by more exact knowledge of the sequence of events that follow one another when microorganisms are introduced into the body, has modified these practices. It is generally recognized that anthrax does better with the introduction of serum, without excision, than with excision. We now know that during the period of first incubation, between the contaminating contact and the appearance of the primary lesion, the spirachætae have passed into the lymphatics. The future will elucidate still further all these questions. There may be less, rather than more, surgery in this particular field. With more exact understanding of the way accidental inoculation takes place, the various infections should decrease. Tuberculosis is apparently decreasing. Should it be eliminated or brought under control, as it may well be, a large field of surgical practice would be removed. Syphilis, in some countries at least, is on the increase, but the severer forms leading to ulcerative and disfiguring deformities that came so often into the hands of the surgeons of the past seem to be decreasing, due to early recognition and prompter treatment and probably also to more resistance on the part of the subject or an attenuated virus. The philosopher, Dr. Pangloss, in 1798, lost an eye and most of his nose before he was cured. I recommend the perusal of the genealogy of his infection in Voltaire's "Candide."

The introduction of chemotherapy by Ehrlich, with a direct attack on the causative agent, brings up the interesting question of the possibility of a sterilisans magna

which, injected directly into the blood, will destroy micro-parasites. Among the endless synthetic compounds will one be found that interferes with the life and nutrition of the minute vegetable cells and yet does not interfere with the life, nutrition and function of the far more delicate animal cells? It is evident that, one by one, the animal parasites are being brought under control by chemical substances. The toxic effect of antimony on the ova of bilharzia is a recent and conspicuous example. There is little evidence as yet of such control in the group of bacteria.

The doctrine of focal infections advanced in the last ten years has had a tendency to increase the number of operations. There has grown up a widespread belief in the efficacy of the removal of the teeth, tonsils, gall bladders, appendices, etc., in many instances showing such slightly morbid changes that they are within the range of similar structures which it has been proved over and over again most of us are carrying about without conscious detriment to our well-being. I believe this tendency will increase. The impulse comes from the reports of striking improvement in a variety of chronic ailments, such as arthritis, neuralgia, headache, lassitude, world weariness, etc., which I assume may even become more frequent in the future.

Surgeons have excised tumors for years. With more exact notions of the course of malignant neoplasms and a more careful study of the characteristics of the different types, it has become evident that in a considerable number of cases the results have been disappointing. The systematic effort to follow patients that have been operated on, year after year, has brought knowledge of late recurrences. The curious observation that even the wide removal of small neoplasms has not always resulted in curing the patient, and the converse, that patients have remained well for years after the excision of extensive neoplasms fairly close to the growth, have both been disconcerting.

There has grown up at the same time a knowledge of the destructive and inhibiting effect of gamma-rays, either emitted by the X-ray tube or by radium. Growths in certain regions have passed out of the domain of operative surgery. In carcinoma of the cervix, for example, radium has come to be the method of choice. It is recognized to-day that both surgery and the X-ray have a place; that the best we can do for cancer is still to excise it widely; but that frequently an operation must be considered palliative and supplemented by other methods. These changes in the attitude of the surgeon toward neoplasms have all been admirably reviewed in a recent paper by Prof. F. C. Wood.

The knowledge that cancer develops most frequently in areas of chronic ulceration and in slightly damaged tissue has introduced the conception of a pre-cancerous stage. A widespread belief has grown up that all areas that have been subject to chronic irritation, all chronic ulcerations, moles, warts, senile keratoses, healed lacerations, etc., should be removed. This is increasing the field of surgery at present and probably will do so even more in the immediate future.

What will the future show? A few days ago I told one of my friends who has specialized in the subject of malignancy and whose acumen, experience and sceptical attitude are widely known, that I was going to suggest as a possibility that within a hundred years the etiology of malignant neoplasms would be known. He replied: "It is possible within a thousand years." I make bold to suggest, however, that within fifty years we may know enough to completely change surgical practice and to remove certain at least of the new growths altogether from the field of surgery and that we shall look back on our present efforts as extraordinarily crude. I admit to-day that the student of malignancy is bound to feel as Harvey felt when he first watched the beating of the tumultuous heart and attempted to make out the sequence of happenings. He wrote, you remember: "When I first gave my mind to vivisections, as a means of discovering the motions and uses

of the heart, and sought to discover these from actual inspection and not from the writings of others, I found the task so truly arduous, so full of difficulties, that I was tempted to think, with Fracastorius, that the motion of the heart was only to be comprehended by God." But the circulation was discovered and the movements of the heart made clear, notwithstanding Fracastorius, and all seems simple to-day.

One may say that thirty years ago a surgeon was concerned with the anatomical consideration of whether he could remove a given tumor. To-day, having mastered the technical difficulties, he is confronted with the question as to how much he accomplishes with a given mutilation and as to when a given area of chronic irritation is to be considered a precursor of cancer.

The control of abnormal function, when accompanied by obvious hypertrophy of a gland, has furnished conspicuous successes in the surgery of the spleen and partial successes in the surgery of the thyroid. The extirpation, excision and division of nerves has, for years, been a recognized measure in treating intolerable neuralgias. Recently there has been an interesting tendency, guided by these experiences, to extend the field. The suprarenal of normal size and appearance, for example, has been partially excised for epilepsy, neurasthenia and in conjunction with the thyroid for exophthalmic goitre. Recently it has been partially removed in a number of instances for gangrene due to endarteritis and Raynaud's disease.

Twenty-two years ago Jonnesco reported a series of 159 cases in which he had removed the cervical sympathetic ganglia and chain. Twenty-five of these were in exophthalmic goitre and were reported as complete successes, every symptom disappearing. Recently a number of operations have been introduced on other portions of the involuntary nervous system to control spasm or supposed spasm or to cause dilatation. Portions of the autonomic system that supply the pylorus have been excised to relieve pyloric

spasm; the perivascular sympathetic fibres have been removed to cure various conditions such as chronic ulceration, gangrene, causalgia, Raynaud's disease, etc. Peripheral facial paralysis has been treated by removing the superior cervical sympathetic ganglion. The lumbar sympathetic ganglia have been removed to relieve congenital megalocolon. It is unnecessary to multiply examples. New operations are appearing and will continue to appear in this field.

Surgery seems to be changing from a science largely concerned with normal anatomy and palpable and visible morbid anatomy to one especially concerned with normal and morbid physiology. Disturbances of function were, in the past, only considered when obviously connected with gross alteration in structure. The surgery of yesterday was dominated by anatomy, the surgery of to-day is dominated by physiology and the surgery of to-morrow will be more so.

Which of these newer procedures will survive and take a permanent place in surgery? One can only say that few, so far, have gained any widespread recognition. They have been introduced for the most part as being successful in practice, the reason of the efficacy of the procedure being unknown. The proof of their virtue is founded on the reports of a few cases in which improvement occurred and which, in the early reports, is nearly always described as "truly astonishing." The value of many of these procedures may be in the stimulus given to exact study to affirm or refute the theory propounded and the results reported. Unfortunately medical history is filled with similar reports of extraordinary cures resulting from all sorts of drugs and chemicals and all manner of procedures. I recommend anyone who is interested in the subject to look up the different measures which have cured or benefited either epilepsy or erysipelas.

The surgeon of the past read and studied anatomy and then worked out his operation on the cadaver. I believe the surgeon of the future will read and study physiology

as he studied anatomy in the past and, as he worked out the technique of his operation from the anatomical standpoint, so in the future, he will think of the purpose of his operation after careful consideration of the experimental facts already given in the textbooks of physiology.

Will the future show not only an effort to control function by excision but by transplantation? Will a technique be perfected which will make transplantation as frequent as partial excision? Will failing function in an organ like the kidney be restored by transplanting a sound kidney. I remember a discussion just after Carrel and Guthrie, twenty-two years ago, reported "The successful transplantation of both kidneys from a dog into a bitch with the removal of both normal kidneys from the latter," in which such a prediction was made. It seemed to me at the time unlikely. Are Voronoff and Steinach correct and will the surgery of the future record thousands of operations transplanting monkey glands and cutting off the vas deferens? As exact knowledge accumulates it seems to me that the trend will be toward diminishing rather than increasing surgical practice in all these fields. With an exact knowledge of the so-called endocrine balance, with the introduction of artificial chemical imitations of the various hormones, with the possibility of exact knowledge of the cause of the insufficiency or over-activity, may we not look back even on the effort to control an over-acting thyroid by cutting portions of it away, without the slightest knowledge of the agents that have incited it to increased activity, as but an improvised measure?

It seems to me less fanciful to imagine a knowledge sufficient to enable a recognition of the causes of chronic changes in the kidneys, and their avoidance, than to imagine the social rearrangements necessary to obtain sound human kidneys and the difficulties in technique necessary to keep a highly specialized organ like the kidney alive outside the body for any length of time. Notwithstanding the vigor and lust of the goat described by Voronoff, after testicular grafting, my imagination finds it simpler to see

a possible return to a perfection of the method of Brown-Séquard. Old men may take, each morning, a potent chemical product, the exact imitation of a testicular hormone, and have the delusions of youth return. Old men, that is, who have not the wisdom of Cephalus, that delightful old man recorded in Plato's "Republic" who, when asked what report he gave of old age, quoted a saying of the aged Sophocles who, in reply to a similar question said: "Peace, I feel as if I had escaped from a mad and furious master."

One of the most brilliant and best known surgeons of France, Leriche, in his address on taking the Chair of Surgery in Strassburg, delivered in 1925, spoke on the future of surgery. I wish to call your attention to the views expressed. "Surgery," he said, "has become one of the most important branches of physiology and if its supreme aim is therapeutic it has equally as an aim the knowledge of the healthy man and the sick man and should be considered as one of the normal procedures in the study of biology. Surgery has arrived at the end of a period largely clinical and technical. It has taken forty years to arrive at this mastery. During this short period it has accomplished a considerable work; it has acquired an admirable sureness in its acts; it has created its methods, studied the morbid physiology of some disorders, fixed the nature, the pathological anatomy and the evolution of a great number of diseases; it has prepared the balance sheet of its possibilities and called in its long term notes. Now, proud but not satisfied, it is at its apogee."

Leriche depicts the future. He sets before the mind's eye his conception of an operation on the heart, accomplished not by dividing a stenosed valve, which may readily heal again, as has been done, but "under certain conditions of cardiac arrhythmia rebellious to medication, the cutting of some small branch at the base of the neck, the suppression of which will diminish the excitability of the musculature of the auricle." He goes on to say that to many minds, to all appearances excellent but in reality

commonplace, there is a divorce between the practice of surgery and these scientific aims.

I beg to place myself among these ordinary minds. I think a surgeon should read, mark, learn and inwardly digest all that he can of physiology, pathology and bacteriology; that he should observe accurately and record with a scrupulous exactness, all that comes in his way in his unrivaled opportunity to see and study normal and abnormal function and structure; that he should be scientifically minded and scientifically educated and should heartily dislike unchecked reports and unverified theories. He should recognize that proof lies not in a few observations made shortly after a given procedure. He should be aware of the multitude of interfering conditions and remember that the experimental method is part of scientific verification. But he should know that his aim is solely curative and that all the rest is incidental. He gains his livelihood by his procedures and is under scrupulous obligation in this regard. Otherwise he should narrow his fields of observation and become an experimental physiologist and he should have a scientific recognition of the difference between an experimental physiologist and a surgeon. I will give an example. I read in a physiology recently published, in an article on "Coagulation" the following statement: "Surgeons have frequently noticed that total hysterectomy is less grave than sub-total. In the latter case, at times, one sees death from embolism. It seems as if the surface of the divided uterine muscle exerted an action favorable for thrombosis." How many observations led to this conclusion? How careful were the observations made on the source of the primary thrombus? Is this a scientific statement and was the surgeon, as a physiologist, contributing a verified fact?

All has a bearing on the future of surgery. Is surgery about to enter on an experimental phase; is it about to abandon the sure footing which has kept it free from much of the jargon of the medical practitioner? It seems to me unlikely. It seems far more probable that the future will

show surgery guided largely by common sense as it has been in the past, with an instinctive distrust of all that cannot be demonstrated by a large body of results. The practical mind of the surgeon will again perhaps be rather too incredulous rather than too credulous of new procedures and ideas.

All great advances so far have come from the allied sciences. We owe even the anesthetics nitrous oxide, ether and chloroform to the English chemist Davy, to another English chemist and physicist Faraday and the French scientist, Flourens, although we associate their practical introduction with the names of two American dentists and a Scottish physician. A professor of chemistry, Pasteur, made the great induction that microparasites caused infection. Röntgen, a pure physicist, introduced the X-ray. Has science nothing more to offer? I feel certain it has.

We may, to be sure, be starting on a phase when advance, for a long time, will be hardly perceptible, as in the period between Galen and Vesalius. We may have reached the limit of modern technical methods. The microscope and the methods of staining tissues may reveal nothing further. Physiology and physics may become more and more esoteric, given over to formulae and curves intelligible only to the initiated. I do not believe it. If you look at the past there has been this extraordinary elucidation of one thing after another going on, teaching nothing of the ultimate meaning of things, increasing, not diminishing the mystery, but leading us by definite and logical action to avoid and produce certain sequences. Knowledge is cumulative and the successive additions seem to be coming faster and faster.

That the surgeon of the future will have far more exact knowledge of things pertaining to his art to aid him, I cannot question. That medical science may take much out of the field of surgery that we think of to-day as permanently there, seems to me likely and that it may bring certain disorders incidental to new conditions into its sphere seems probable.

But the new knowledge will but increase the difficulty of understanding the ultimate causes of things. As Maeterlinck says somewhere, I think in the "Life of the Bee": "The purpose of knowledge is to increase our fields of conscious ignorance." Matter was comfortably defined when I was in college as anything that occupies space or as that which we can perceive by our sense of touch. To-day the material world is uneasily poised on immaterial atoms. I give a recent definition of matter: "Matter is but the sequence of events in experience and nature." We may even be about to find out and bridge over the bond between the physico-chemical on the one hand and the vital on the other. Therefore the comfort of working in one of the great handicrafts of to-day and to-morrow, one which deals with proximate and obvious causes, and aims at performing its manual acts so deftly and so gently that pain is relieved, deformities corrected, the normal workings of the body restored with trifling damage to the delicate living cells, and little disturbance to the organism as a whole.

Dr. Panglos, the great optimistic philosopher, said to Candide: "There is a concatenation of events in this best of all possible worlds." "All that is very well," answered Candide, "but let us cultivate our garden."

COMMITTEE ON MEDICAL EDUCATION

ABSTRACT OF A REPORT OF THE SUB- COMMITTEE ON SURGICAL COURSES

SUGGESTIONS FOR IMPROVING POST GRADUATE TEACHING IN THE OPERATIVE SPECIALTIES

A review of the post graduate courses offered in the surgical specialties in New York City give the distinct impression that they are inadequate and that there is need for improvement. New York City with its enormous clinical facilities should be the teaching center of the western hemisphere. It should be a place where specialists are trained and where doctors may come to improve themselves in their respective specialties.

There is at the present time no adequate control over physicians who propose to practice a surgical specialty or who are doing surgery, nor is there any prescribed method of procedure by which one may qualify as a surgeon. It is true the American College of Surgeons requires the submission of a certain number of case-records before a candidate is admitted to membership in that body, but there is no supervision or requirement regarding the obtaining of these records. It seems that the entire system of developing specialists may well be changed. Graduation from a recognized medical school or even graduation from a general hospital is hardly sufficient to qualify the average doctor as a specialist in any of the surgical branches. It would seem wiser to require a special period of training for every physician who intends to become a specialist in one of the operating specialties. Of the many house surgeons who are being graduated from general hospitals only a small percentage can ever hope to become members of the attending staff. The majority enter general practice after a hospital course which has been largely specialistic, and much of the training has been wasted on them. We would therefore suggest that an attempt be made here in New York City to get the various hospitals to agree upon some definite plan for improvement.

New York University and Bellevue Medical School has taken the initial step in this regard by establishing a course of post graduate instruction lasting $2\frac{1}{2}$ years. It is composed of laboratory work, demonstrations, lectures and practical hospital work. During the latter period the student assumes the position of an adjunct surgeon and actually performs operations. Such a course may well serve as a guide; on the other hand the following plan may work out more satisfactorily for a larger group.

The majority of the New York hospitals offer a general course of interneship of about 2 years, emphasizing either medicine or surgery, as the case may be. We would suggest that an attempt be made to get all hospitals to agree to offer a general course of one to two years to include medicine, surgery, obstetrics, gynecology and all the specialties as far as they are able to, in order to fit a candidate for general practice. None of these graduates however should be permitted to pose as specialists or to perform major operations.

Those men who during their interneship show special desire or inclination to perfect themselves in a given specialty should at the end of their period be eligible for appointment as fellow or resident to serve a given period of one to two years, during which time they should be given opportunity to perform major operations and to study every phase of their specialty in the wards, the laboratory, the clinic and the x-ray department. We feel that there is a trend along this line at the present time, and that we in New York City should anticipate it and take steps in this direction.

Those men who desire to take up the various specialties such as ophthalmology, otology, laryngology, urology or any other subdivision should try to get appointments in special hospitals devoted to those subjects or in the specialistic departments of the larger general hospitals.

The Committee recommends the establishment of some organization which will work out a detailed plan along

the lines indicated. The Academy of Medicine would be the logical institution to do so, perhaps in collaboration with the well endowed medical schools and all the larger hospitals of our city that are willing to coöperate. The entire plan would be voluntary on the part of the interested institutions. The Committee in charge might be authorized to confer a special surgical degree or diploma on the candidates taking the course. In case the plan proves successful an attempt might be made to make it national in scope. It would seem that the American College of Surgeons should have a sub-department to study the entire problem of post graduate teaching of surgery in America.

LIBRARY NOTES

EXHIBITION OF BOOKS, PORTRAITS, ETC., IN CELEBRATION OF
THE TERCENTENARY OF THE PUBLICATION OF
WILLIAM HARVEY'S *De Motu Cordis*

The exhibition in the Library was opened on the evening of 11th May when the members of the Harvey Society of New York dined together at the Academy and Dr. Alfred E. Cohn delivered the anniversary address. Most of the books shown were the property of the Academy but we are very grateful to various Fellows and other persons for so generously lending rare volumes. Those who visited the exhibition may remember several books which had belonged to the late Dr. Walter B. James, kindly lent by Mrs. James; these, and chief amongst them the first edition of the *De Motu Cordis*, have now been graciously presented to the Academy. The University of Nebraska lent us a copy of the rarest edition of one of Harvey's works and for this kindness we return our best thanks.

The exhibition was continued in its original state until the middle of June and the borrowed books and pictures were returned to their owners. The collection, otherwise intact, will be kept in the cases, however, until a date early in September when the Medical Library Association meets at the Academy. Certain additions have been made possible as there were some important Harvey items found amongst those books, formerly owned by Dr. E. C. Streeter, of Boston, which were acquired recently by the Academy.

It was thought useful to include in square brackets, after the separate editions of Harvey's works, the number given in *A Bibliography of the Writings of William Harvey* by Dr. Geoffrey Keynes which has appeared since this exhibition was opened.

Our excuse for publishing this list is that doctors, students and librarians may care to see exactly how we arrange such exhibitions. At one and the same time it gives some account of the life of a man and of his works, and also tells something of the growth of a scientific idea.

HARVEY'S EDUCATION, ETC.

1. Card inscribed:

William Harvey was born at Folkestone, Kent, 1st. April, 1578.

The eldest of "a weeke of sons." (Fuller, Thomas. *History of the Worthies of England*. Lond. 1662. Sect. on Kent.)

2. A photograph of Dr. Alfred E. Cohn's chronological chart showing Harvey's relations with other men and with important events of history.

3. Picture of the Gate of Honour, Caius College.

In: Thompson, A. Hamilton. *Cambridge and its colleges*. 3. ed. rev. & enl. London, Methuen & co. Ltd. [1910].

On leaving school he entered Gonville and Caius College, Cambridge (B.A. 1597).

(Lent by the Librarian.)

4. Picture of the façade of Padua University.

From: Guzzoni. *L'Italia ostetrica*. 1911. Fig. 1.

The façade of the university building at Padua at the beginning of the seventeenth century. [Reproduced in Spencer, H.R. *William Harvey*... London, Harrison & sons, 1921. p. 9.]

In 1600 Harvey entered Padua University, which had the best medical faculty at that time.

5. Picture of the Anatomical Theatre at Padua.

From: Curtis, J. G. *Harvey's views on the use of the circulation of the blood*. N. Y., Columbia Univ. Pr., 1915: The anatomical theatre at Padua, where William Harvey listened to the lectures of Fabricius ab Aquapendente (1537-1619). This theatre was erected by the Seignury of Venice in 1593 as a tribute to Fabricius.

6. A picture of Harvey's coat of arms, or stemma, at the University of Padua.

From: Power, D'Arcy. *William Harvey*, New York. Longmans, Green & Co., 1898.

7. Diploma of Harvey from the University of Padua (1602), in facsimile, [n.p. 1908 ?].
8. Payne, J. F. *Notes to accompany a facsimile reproduction of the diploma of doctor of medicine granted by the University of Padua to William Harvey, 1602*, with a translation. Privately printed, London (Chiswick Press), 1908.
9. Photostat of the last page of Harvey's diploma with signature of Fabricius.
From the facsimile of Harvey's diploma [vide no. 7].
10. A picture of Linacre's house, No. 5, Knight-Rider Street, the home of the Royal College of Physicians of London, of which Harvey became a Fellow in 1607. Thomas Linacre (1460-1524), the scholar-physician, was one of the Founders of the College in 1518. From a picture in [Macmichael, William], *The Gold-headed Cane*, which appeared for the first time in the second ed., London, John Murray, 1828, p. 121.
11. Facsimile of Harvey's signature.
From: Aveling, J. H. ed. *Memorials of Harvey*. London, J. & A. Churchill, 1875. p. 26. [Keynes, no. 51.]
12. Reproduction of a portrait of Harvey.
From: Lloyd, R. W. A portrait of William Harvey. *Lancet*, 1927. i, 623.
Attributed to Sir Peter Lely.
13. Plan of Saint Bartholomew's Hospital, London, in 1617; Harvey was appointed an assistant physician in 1609.
From: Moore, Norman. *History of St. Bartholomew's Hospital*. London, C. Arthur Pearson Ltd., 1918. ii, 260.

14. Card inscribed with four quotations about Harvey.
From: Aubrey, John. *Letters written to Eminent Persons*....., *Lives of Eminent Persons*, London, 1813. ii, part 2.
15. Card inscribed with a quotation about Harvey.
From: William Heberden's MS. in the Royal College of Physicians, quoted in Power, D'Arcy, *William Harvey*. N. Y., Longmans, Green & Co., 1898, p. 145.
16. Card inscribed:
In 1618 Harvey was appointed Physician Extraordinary to James I and was later Physician to Charles I and on terms of warm friendship with him.
17. Photograph of the pointer or wand made of whale-bone decorated with silver, which Harvey used at his lectures. Along with the gold-headed cane, it is one of the treasured possessions of the Royal College of Physicians. The College kindly allowed us to have this photograph taken.
18. Harvey, William. *Prelectiones anatomiae universalis*. Ed. by a committee of the Royal College of Physicians of London. London, J. & A. Churchill, 1886. [Keynes, No. 52.]
Reproduction and transcription of Harvey's notes as Lumleian lecturer at the Royal College of Physicians opened at the title-page. Harvey was appointed in 1615, and did not resign until 1656. The original MS. of these notes is in the British Museum.
19. Facsimile of the famous page (p. 80 verso) on which the circulation is described for the first time.
In: Harvey, William. *Prelectiones anatomiae universalis*. London, J. & A. Churchill, 1886. [Keynes, No. 52.] (This copy is kindly lent by Dr. Eli Moschcowitz.)

EDITIONS OF *DE MOTU CORDIS*

20. Card inscribed :

Up to 1824 there were 19 editions of the *De motu cordis*, 16 Latin, 2 English, and 1 Dutch.

A facsimile of the 1st. edition, a new edition of the first English text, and a new English translation are appearing in 1928.

21. Harvey, William. *Exercitatio anatomica de motu cordis et sanguinis in animalibus*. Francofurti, Sumptibus Guilielmi Fitzeri, 1628. [Keynes, No. 1.]

The first edition of the *De motu cordis*.....

This copy belonged to the late Dr. Walter B. James (1858-1927) and has been kindly given to the Academy by Mrs. James. This is the first edition of one of the greatest medical books of all time—Albrecht von Haller (1708-1777) called it “a little work of gold” and Flourens (1794-1867) “le plus beau livre de physiologie.” With the book is a postal card written by William Osler (1849-1919) to Dr. James, posted on Feb. 27, 1906, about this copy and another one.

22. The paragraph in which the doctrine of the circulation is enunciated.

In: Harvey, William. *Exercitatio anatomica de motu cordis et sanguinis in animalibus*. Francofurti, Sumptibus Guilielmi Fitzeri, 1628. p. 41. [Keynes, No. 1.]

(Kindly lent by the President, Dr. Samuel W. Lambert.)

23. The only illustrations.

In: Harvey, William. *Exercitatio anatomica de motu cordis et sanguinis in animalibus*. Francofurti, Sumptibus Guilielmi Fitzeri, 1628. Fig. 1-4. [Keynes, No. 1.]

(Copy kindly lent by Dr. Horatio Williams, Professor of Physiology at the College of Physicians and Surgeons, N. Y.)

24. The page of errata.

In: Harvey, William. *Exercitatio anatomica de motu cordis et sanguinis in animalibus*. Francofurti, Sumptibus Guilielmi Fitzeri, 1628. [Keynes, No. 1.]

Unfortunately the book was badly printed upon poor paper so that the leaves of most copies are now foxed, or discoloured. Harvey was far away from the printing press and wrote an atrociously crabbed hand. There is a page and a quarter of errata in this copy and the paper throughout is thin and poor; the other three copies shown have not the errata and the paper is of better quality. This copy, a gift from the author to Marcus Aurelius Severinus (1580-1656), whose notes are found throughout, belonged to the late Dr. Jacques Loeb (1859-1924) and has kindly been lent by the latter's son, Dr. Robert Loeb. (Note the broad margins of this copy.)

25. Harvey, William. *De motu cordis et sanguinis in animalibus*.....

Lugduni Batavorum, ex off. Ioannis Maire, 1639. [Keynes, No. 3.]

26. Harvey, William. *De motu cordis et sanguinis in animalibus*.....

Patavii, apud Sebastianum Sardum. Sumptibus Dominici Ricciardi. 1643. [Keynes, No. 4.]

27. The first English edition.

Harvey, William. *The anatomical exercises.... concerning the motion of the heart and blood*. London. Printed by Francis Leach for Richard Lowndes, 1653. [Keynes, No. 19.]

28. The enunciation of the new doctrine in the first English edition.

In: Harvey, William. *The anatomical exercises.... concerning the motion of the heart and*

blood.....London, printed by Francis Leach, for Richard Lowndes. 1653, p. 45. [Keynes, No. 19.]

(Kindly given by Mrs. Walter B. James.)

29. Harvey, William. *Exercitationes anatomicae de motu cordis et sanguinis circulatione*.....Roterodami, ex off. Arnoldi Leers, 1654. [Keynes, No. 8.]
(Kindly lent by Dr. Eli Moschcowitz.)

30. Harvey, William. *Exercitationes anatomicae de motu cordis et sanguinis circulatione*. Roterodami, ex off. Arnoldi Leers, 1660. [Keynes, No. 9.]
The engraved title-page is dated 1661.

31. Harvey, William. *Exercitationes anatomicae de motu cordis et sanguinis circulatione*. Londoni, ex off. R. Danielis, 1660. [Keynes, No. 10.]

32. Harvey, William. *The anatomical exercises*.....
concerning the motion of the heart and blood.....
London, printed for Richard Lowndes.....and
Math. Gilliflower, 1673. [Keynes, No. 20.]
(Kindly given by Mrs. Walter B. James.)

33. Harvey, William. *Exercitationes anatomicae de motu cordis et sanguinis circulatione*. Glasgae, in aedibus R. Urie, sumptibus D. Baxter. 1751. [Keynes, No. 15.]

34. Harvey, William. *Exercitationes de motu cordis et sanguinis*.....Edinburgi, Ven. apud Joannem Carfrae et Filium; atque Longman et Socios, Londini, 1824. [Keynes, No. 16.]

35. A little known English translation.

In: *London Medical and Surgical Journal*. London, 1832, i, 523. [Keynes, No. 21.]

The editor of this medical magazine, Dr. M. Ryan, is the translator. A "biographical sketch of the illustrious author" is prefixed. The translation was continued throughout 1832 and finished in volume ii for 1833.

36. Card inscribed with a quotation from Harvey on comparative anatomy.

From his: *De motu cordis*....trans. by R. Willis, London, 1847, p. 35. [Keynes, No. 48.]

"Had anatomists only been as conversant with the dissection of the lower animals as they are with that of the human body, the matters that have hitherto kept them in a perplexity of doubt would, in my opinion, have met them freed of every kind of difficulty."

37. Card inscribed with a quotation from Huxley about the *De motu cordis* that it "contains the first application of quantitative considerations to a physiological problem."

From: *Popular Science Monthly*, 1878, xii, 396.

38. Harvey, William. *La circulation du sang; des mouvements du coeur chez l'homme et chez les animaux. Traduction française*.....par Charles Richet, Paris, G. Masson, 1879. [Keynes, No. 28.]

39. Harvey, William. *An anatomical disquisition on the motion of the heart and blood in animals*.....translated from the Latin by Robert Willis. London, J. M. Dent & Co. New York, E. P. Dutton & Co. [1907]. (Everyman's library.) [Keynes, No. 24.]

A cheap edition which every doctor and student should buy and read.

40. Harvey, William. *Die Bewegung des Herzens und des Blutes*, 1628. Uebersetz.....von R. Ritter von Töply. Leipzig, Johann Ambrosius Barth, 1910. (Klassiker der Medizin. Bd. 1.) [Keynes, No. 27.]

41. Engraving of Harvey after Bemmell.

A plate in: Birch, Thomas. *The heads of illustrious persons of Great Britain; engraven by Mr. Houbraken and Mr. Vertue, with their lives and characters*. London, John & Paul Knapton, 1747.

(Kindly lent by the President, Dr. Samuel W. Lambert.)

42. Harvey, William. *An anatomical dissertation upon the movement of the heart and blood in animals.Privately reproduced in facsimile from the original edition printed at Franckfort-on-the-Maine in the year 1628.for G. Moreton. Canterbury, 1894. [Keynes, No. 23.]*

The Academy possesses a large paper copy of this book. The portrait which is reproduced is in the National Gallery, London.

(Kindly lent by Dr. Eli Moschcowitz.)

43. Harvey, William. *Exercitatio anatomica de motu cordis et sanguinis in animalibus. Francofurti, sumptibus Guilielmi Fitzeri, 1628. [Facsimile edition.published in 1928 three hundred years after the first edition.] R. Lier & Co., Florence. [Keynes, No. 17.]*

Evidently to the original copy, of which this is a facsimile, the page and a quarter of errata had not been added.

44. Harvey, William. *The anatomical exercises. De motu cordis 1628: De circulatione sanguinis 1649: the first English text of 1653 now newly edited by Geoffrey Keynes; issued on the occasion of the tercentenary celebration of the first publication of the text of De motu cordis. London, The Nonesuch Press, [1928]. [Keynes, No. 25.]*

45. Galley proof sheet of chapter xiv and part of chapter xv.

A new translation of *De motu cordis* by Chauncey D. Leake, which will appear shortly.

CONTROVERSIAL LITERATURE

46. James Primrose's book.

Jacobi Primrosii.Exercitationes et animadversiones in librum de motu cordis et circulatione

sanguinis adversus Guilielmum Harveum.....
Londini, excudebat Guilielmus Jones. 1630.

The first edition of Primrose's book was published from London in 1630, the year after Harvey examined and passed him for entrance into the Royal College of Physicians.

47. Another book by Primrose.

Jacobi Primrosii.....*Antidotum adversus Henrici Regii Ultraiectensis medicinae professoris vencuatam spongiam sive vindiciae animadversionum*. Lugduni Batavorum, ex off. Ioannis Maire. 1644.

A further blast from Primrose who defends his *Animadversiones* against the attack of Henricus Regius (Leroy) who in his thesis *Spongia quae elecuntur sordes Animadquas Jac. Primrosius advers. Theses, &c. edidit*, Leyden. 1640, sides with Harvey.

48. Engraved portrait of Jean Riolan.

The original is in the Ecole de Médecine, Paris. Jean Riolan, the son, first published his criticisms of the circulation in 1648 and 1649.

49. Photostat of title-page of Jean Riolan's *De motu circulatorio*.....

Londini, Typis Milonis Flesher, 1649.

50. Harvey, William. *Exercitatio anatomica de circulatione sanguinis. Ad Joannem Riolanum filium*.*Cantabrigiae, ex officina Rogeri Danielis*, 1649. [Keynes, No. 31.]

"The rarest Harvey item" (Osler)—the first edition of the epistle to Riolan.

(Kindly lent by the University of Nebraska.)

51. Harvey, William. *Two anatomical exercitations concerning the circulation of the blood. To John Riolan, the son*.....London, printed by Francis Leach, 1653.

Another edition of the epistles to Riolan and, as is usual, bound with the first edition of the *De motu cordis* in English (1653). [Keynes, No. 19.]

(Kindly lent by Dr. A. E. Cohn, the Harvey lecturer on this occasion.)

52. Harvey, William. *Two anatomical exercitations concerning the circulation of the blood; to John Riolan the son.* London, printed 1673.

Bound with the second edition of the *De motu cordis* in English (1673). [Keynes, No. 20.]

53. De Back, James. *The discourse. . . . and annexed, an addition in defence of Harvey's circulation.* London, printed by T. R., 1673.

Bound with the second edition of the *De motu cordis* in English (1673). [Keynes, No. 20.]

54. Card inscribed:

In France, Qui Patin called Harvey's followers the "circulateurs"—the Latin "circulator" meaning quack or charlatan; but Descartes recognized the truth of Harvey's discovery.

CONTRIBUTORS TO THE STORY OF THE CIRCULATION

55. Reproduction of portrait of Hippocrates.

Hippocrates (460-370 B.C.) said the heart was a muscle and the pulse was due to the movement of the blood vessels.

56. Reproduction of a bust of Aristotle.

For Aristotle (384-322 B.C.) the heart was the centre of the vascular system but also the focus of heat of the body and the seat of intelligence.

57. Reproduction of a portrait of Erasistratus.

Erasistratus (Fl. 300-260 B.C.) of Alexandria described the heart valves but thought the arteries contained air.

58. Reproduction of a portrait of Galen.

Galen (131-201 A.D.) of Pergamos was the first experimental physiologist—he cut into an artery and showed that it contained blood alone. For him the liver was the centre of the vascular system and the blood ebbed and flowed in both arteries and veins and passed through invisible pores in the septum from the right to the left side of the heart. His views dominated until the XVI century.

59. Reproduction of a portrait of Servetus.

Servetus (1509-1553) described the pulmonary circulation in his theological and heretical book, *Christianismi restitutio* (1553) but he did not think of the heart as a pump.

60. Reproduction of a portrait of Vesalius.

Vesalius (1514-1564), the father of modern anatomy, stated in the second edition of his *De fabrica humani corporis* (1555) that he could find no pores in the septum of the heart.

61. Reproduction of a portrait of Realdus Columbus.

Realdus Columbus (1516?-1559) said, in his *De re anatomica* (1559), that the heart was a muscle but denied that the blood went through the interventricular septum. He described the pulmonary circulation and probably did not know of Servetus's book.

62. Reproduction of a portrait of Caesalpinus.

Caesalpinus (1519-1603) was the first to use the word "circulation"; he clearly grasped the pulmonary circulation and had also laid hold of the systemic circulation, but said the heart was not a muscle and the septum was porous. The heart according to this view would not serve any great purpose in the circulation as Harvey discovered and described it.

63. Reproduction of a portrait of Leonardo da Vinci.
Leonardo da Vinci (1452-1519), by distending the lungs with air, proved that air did not go directly into the pulmonary veins. He described four chambers of the heart and knew that the valves at the roots of the great arteries prevented blood flowing back into the heart.
64. Reproduction of a portrait of Fabricius.
Fabricius ab Aquapendente (1537-1619) in his *De venarum ostiolis* (1603) said the valves of the veins existed to prevent all the blood from flowing in the veins to the feet or hands. Possibly it was this book of his teacher's that led Harvey to work on the vascular system.
65. Reproduction of a portrait of Malpighi.
Malpighi (1628-1694) in his *Observationes anatomicae pulmonibus* (1661) described the capillaries of the pulmonary circulation as he saw them through a microscope.
66. Reproduction of a portrait of Leeuwenhoek.
Leeuwenhoek (1632-1723) in 1688 not only observed the systemic circulation with his microscope but also saw the blood corpuscles passing through the tiny capillaries.

WRITINGS ON THE HISTORY OF THE DISCOVERY

67. The phrase "aureo opusculo" of Albrecht von Haller (1708-1777), the great bibliographer and physiologist, on page 363 of his *Bibliotheca anatomica*, Leyden, 1774, vol i.
68. Coxe, John Redman. *An inquiry into the claims of Doctor William Harvey to the discovery of the circulation of the blood*. Phila., E. L. Carey & A. Hart, 1834.
69. Flourens, P. *Histoire de la découverte de la circulation du sang*. 2. éd. rev. Paris, Garnier Frères, 1857.

(Lent by the Librarian.)

70. Dalton, J. C. *Doctrines of the circulation*. Phila., Henry C. Lea's Son & Co., 1884.

Two [cf. item 73] of the best books on the history of the circulation—both came from the same department of the same medical school (College of Physicians and Surgeons, N. Y.)

71. Payne, Joseph Frank. *Harvey and Galen. The Harveian Oration delivered.....Oct. 19, 1896*. London, Henry Frowde, 1897.
72. Osler, William. *The growth of truth as illustrated in the discovery of the circulation of the blood.....Harveian Oration delivered.....Oct. 18, 1906*. London, Henry Frowde, 1906.
73. Curtis, John G. *Harvey's views on the use of the circulation of the blood*. New York, Columbia University Press, 1915. [Cf. item 70.]
74. Singer, Charles. *The discovery of the circulation of the blood*. London, G. Bell and Sons, Ltd., 1922. (Classics of Scientific method.)
75. Rolleston, Sir Humphrey. "The reception of Harvey's doctrine of the circulation of the blood in England as exhibited in the writings of two contemporaries."
In: *Essays on the history of medicine presented to Karl Sudhoff.....edited by Charles Singer and H. E. Sigerist*. Zürich, Seldwyla, 1924. p. 247.

HARVEY'S LIFE (CONTINUED)

76. Photograph of an original letter (1630 or 1631) in the Bodleian Library, Oxford, from Harvey to Viscount Dorchester written while he was on a tour in Europe with the Duke of Lennox. From: *Clarendon papers*, 2076.
(Bodley's Librarian kindly allowed us to have this photograph made.)

77. A translation and interpretation (in photostat) of the letter. [Cf. item 77.]

In: *Memorials of Harvey including a letter and autographs in facsimile, collected and edited by J. H. Aveling*. London, J. & A. Churchill, 1875. p. 8. [Keynes, No. 51.]

78. Newspaper clipping: Harvey and the witches:

From: *The Times*, London. 23. Sept. 1926.

A story of how Harvey dealt with a witch. He was also responsible for saving the lives of some other women accused of witchcraft in 1634.

(Lent by the Librarian.)

79. Card inscribed:

Harvey left London in 1642 with King Charles I, when the disturbances of the Civil War broke out. Dr. Percival Willoughby (1596-1685) relates of Harvey's visit to him, in a manuscript now at the Royal Society of Medicine, London, part of which is here shown in a photostat. [Reproduced in: Spencer, H. R. *William Harvey*. . . . London, Harrison & Sons, 1920, p. 34.] Willoughby revered Harvey as the Father of modern midwifery.

80. Reproduction of a portrait of Thomas Parr, reputed to have died at the age of one hundred and fifty-two years and nine months, upon whom Harvey made a post-mortem examination in 1635—the account of which was first published in Bett's *De ortu et natura sanguinis*, Londini, ex off. E. T. 1669, 8°. [Keynes, No. 49.] Illustration in: Rolleston, Sir Humphrey. *Some medical aspects of old age*. London, Macmillan, 1922.

81. A letter from Harvey to Lord Feilding.

Printed in: Mitchell, S. W. *Some recently discovered letters of William Harvey; with other miscellanea*. Phila., 1912. [Keynes, No. 53.]

In 1636 Harvey went on a diplomatic mission with the Earl of Arundel, but in reality to purchase works of art for Charles I in Italy. He

was held in quarantine outside Venice for some weeks. This is one of his letters addressed to Lord Feilding, Ambassador at Venice, which were discovered about twenty years ago and are now in the Royal College of Physicians.

82. Map showing travels of Dr. William Harvey, 1636. In: Power, D'Arcy. A revised chapter in the life of Dr. William Harvey, 1636. *Proc. Royal Society of Medicine*. London, 1916-17, x, Sect. Hist. Med. p. 33.

83. Reproduction of W. F. Yeames's painting of Harvey at the battle of Edgehill.

Frontispiece in: Ogle, John W. *The Harveian oration, 1880*. London, 1881.

Harvey had the Prince of Wales and the Duke of York under his care at the battle of Edgehill not far from Oxford (October 1642). He is said to have read a book until things grew hot and he began his work of dressing the wounded.

84. Reproduction of the portrait of Harvey in Merton College. No. III in *Portraits of Dr. William Harvey*. Published for the historical section of the Royal Society of Medicine. (Edited by Sir D'Arcy Power.) Lond., Oxford University Press, 1913.

In 1645 Harvey was made an honorary M.D. of Oxford and also Warden of Merton College.

(Kindly lent by the President, Dr. Samuel W. Lambert.)

85. Picture of the interior of the west Library at Merton College, Oxford. Illustration in: Clark, J. W. *The care of books*.....Cambridge, University Press, 1901.

The mediæval library; which, no doubt, Harvey frequented during his stay of four years at Oxford; part of the time the town was besieged by the Parliamentary Forces.

86. Engraved portrait of Sir Charles Scarborough.

Sir Charles Scarborough (1616-1694) physician to Charles II and James II, whom as a young man Harvey took under his wing at Oxford. In his will Harvey left him his "velvet gown" and "little silver instruments of surgerie."

87. Card inscribed:

In 1651 Harvey (always generous to the Royal College of Physicians) built "a great parlour, a kind of convocation house for the fellows to meet in below, and a library above." (Aubrey.)

88. Card inscribed:

Harvey declined to be President of the College in 1654 owing to old age and poor health. In 1656 he made over his paternal estate of Burmarsh, Romney Marsh, Essex, to the College, the rents from which were to provide for:

1. An annual feast.
2. An annual oration.
3. A salary for the librarian.

EDITIONS OF THE *DE GENERATIONE*, ETC.

89. Card inscribed with Percival Willoughby's tribute to Harvey.

From his: *Observations in midwifery*. Warwick, H. T. Cooke, 1863. "I know none but Dr. Harvey's directions and method, the which I wish all midwives to observe, and follow and oft read over and over again and in so doing they will better observe and understand and remember the sayings and doings of that most worthy good and learned Dr. whose memory ought to be had forever in great esteem with midwives and child bearing women."

[Reproduced in: Spencer, H. R. *William Harvey* London, Harrison & Sons, 1921, p. 39.]

90. Card inscribed: In his investigations of the circulatory and generative systems, Harvey dissected eighty different species of fish, birds and animals.

91. Engraved portrait of Sir George Ent.

Sir George Ent (1604-1689) who visited Harvey at Christmas 1650 and induced him to allow the *De generatione* to be published. In his will Harvey left him five pounds to buy a ring "to keepe and weare in remembrance of me."

(Kindly lent by Dr. C. L. Dana.)

92. Harvey, William. *Exercitationes de generatione animalium. Quibus accedunt quaedam de partu, de membranis ac humoribus uteri & de conceptione.* Londini, Typis Du-Gardianis, impensis Octaviani Pulleyn. 1651. [Keynes, No. 34.]

The first edition of Harvey's *De generatione*. Note the motto on the egg, "Ex ovo omnia," omitted on the engraved title of two of the three Amsterdam editions of the same year (1651). The Academy now has a copy.

(Kindly lent by the President, Dr. Samuel W. Lambert.)

93. Harvey, William. *Exercitationes de generatione animalium. Quibus accedunt quaedam de partu: de membranis ac humoribus uteri: & de conceptione.* Amstelodami, Apud Ludovicum Elzevirium. 1651. [Keynes, No. 35.]

The engraved title, with motto, is dated "Londini, Apud Octavianum Pulleyn. 1651."

94. Harvey, William. *Exercitationes de generatione animalium. Quibus accedunt quaedam de partu: de membranis a humoribus uteri: & de conceptione.* Amstelodami, apud Ludovicum Elzevirium, 1651. The engraved title is dated "Amstelodami, apud Ludovicum Elzevirium. 1651." and bears the motto "ex ovo omnia." [Keynes, No. 36.]

95. Harvey, William. *Exercitationes de generatione animalium*.....Amstelodami, apud Joannem Janssonium, 1651. [Keynes, No. 37.]

This copy is inscribed on the inner title page "ex dono Authoris," but apparently not in Harvey's hand. The Academy also possesses a copy.

(Kindly lent by the President, Dr. Samuel W. Lambert.)

96. Harvey, William. *Exercitationes de generatione animalium*.....Amstelaedami, apud Ioannem Ravesteynium, 1651. [Keynes, No. 38.]

97. Harvey, William. *Anatomical exercitations concerning the generation of living creatures: To which are added particular discourses of births and of conceptions*...London, printed by James Young for Octavian Pulleyn, 1653. [Keynes, No. 43.]

The first edition in English of the *De generatione animalium*. The frontispiece, an engraving of a sculptured bust of Harvey, is by William Faithorne.

(Kindly given by Mrs. Walter B. James.)

98. George Ent's Epistle to the President and Fellows of the Royal College of Physicians of London, in the first edition in English of the *De generatione* opened to show how Harvey turned over his manuscript to Ent for publication.

(Kindly lent by Dr. Eli Moschcowitz.)

99. Harvey refers to the loss of his manuscripts from his official lodging in Whitehall at the time of the Civil War.

In the first edition of *De generatione* in English, 1653, p. 418. [Keynes, No. 43.]

(Kindly lent by the President, Dr. Samuel W. Lambert.)

100. Card inscribed

"And truly in such pursuits it is sweet not merely

to toil, but even to grow weary, when the pains of discovery are amply compensated by the pleasure of discovery." (Translation of the Latin on p. 18 of Harvey's preface.) In another copy of the 1651, Amsterdam Elzevir edition. [Keynes, No. 36.]

(Kindly lent by the President, Dr. Samuel W. Lambert.)

101. The first edition of the *De generatione* in English, opened to show the first two pages of the poem by "M.L.L., M.D." (Martin Llewellyn, 1618-1682). [Keynes, No. 43.]
102. Harvey, William. *Exercitationes de generatione animalium*.....
Amstelaedami, apud Ioannem Ravesteynium, 1662. [Keynes, No. 39.]
103. Harvey, William. *Exercitationes de generatione animalium*.....
Patavii, Typis heredum Pauli Frambotti, 1666. [Keynes, No. 40.]
104. Harvey, William. *Exercitationes de generatione animalium*....Hagai Comititis, apud Arnoldum Leers, 1680. [Keynes, No. 42.]
105. Brooks, W. K. William Harvey as an embryologist.
In: *Johns Hopkins Hospital Bull.*, 1897, viii, 167.
106. Spencer, H. R. *William Harvey, obstetric physician and gynaecologist*.
Being the Harveian oration.....Oct. 18, 1921.
London, Harrison & Sons, Ltd., 1921. [Cf. item 105.]
The two best commentaries upon Harvey as an embryologist, obstetrician and gynaecologist
[Cf. item 106.]

HARVEY'S WORKS (CONTINUED) AND PORTRAITS

107. Harvey, William. First title: *Exercitatio anatomica de motu cordis et sanguinis in animalibus*..... Lugduni Batavorum, Apud Johannem van Kerckhem, 1737. Second title: *Exercitationes de generatione animalium*.....Lugduni Batavorum, Apud Johannem Kerckhem, 1737. [Keynes, No. 46.]

108. Harvey, William. *Opera omnia. A collegio medicorum Londinensi edita*, 1766. [Colophon]: Londini, excudebat Guilielmus Bowyer, 1766. [Keynes, No. 47.]

The works in Latin published by the Royal College of Physicians. It contains a life of Harvey written by Dr. Thomas Lawrence (1711-1783) which has served as the authoritative source for all subsequent ones.

109. A page of the sale catalogue, dated 1754, of Dr. Richard Mead's (1673-1754) library showing the prices paid for the works of Harvey. Think of a first edition of the *De motu*.....for four shillings and sixpence! The auction sale lasted fifty-six days. In: Baker, Samuel, ed. *Bibliotheca medicina sive catalogus librorum Richardi Mead, M.D.*..... [London 1754.] p. 69.

110. Harvey, William. *The works*.....translated from the Latin.....by Robert Willis. London, The Sydenham Society, 1847. [Keynes, No. 48.]

The first and only complete edition of Harvey's published works in English. It also contains his will and several letters.

111. Portrait of Harvey:

From the original picture by C. Jansen in the possession of the Royal Society (published as a plate in C. Knight's *Portrait Gallery*, London, 1833).

The Royal Society was founded in 1660, after Harvey's death.

(Kindly lent by Dr. C. L. Dana.)

112. Keynes, Geoffrey. *A bibliography of the writings of William Harvey, M.D., discoverer of the circulation of the blood.* Cambridge, University Press, 1928.

The author is a surgeon at St. Bartholomew's Hospital.

113. Mezzotint of Harvey and biographical sketch.
From: *Biographical magazine*, London, 1795.

(Kindly lent by Dr. C. L. Dana.)

114. Reproduction of Sir D'Arcy Power's portrait (painter unknown).

It is doubtful if it is a contemporary one.

(Plate II in the reprint from his article in *St. Bartholomew's Hospital Reports*, 1924, lvii, 96-107.

(Lent by the Librarian.)

115. Reproduction of a portrait of William Harvey, from the painting by Cornelius Jansen in the Royal College of Physicians. In: Singer, Charles. *The discovery of the circulation of the blood.* London, G. Bell & Sons, Ltd., 1922, Pl. V, (Classics of Scientific Method.)

116. Engraving of William Harvey, by J. Thomson.
From Jansen's portrait in the Royal College of Physicians: published in Pettigrew's *Portrait Gallery*, London, 1840 but this is a "proof before letters".

(Kindly lent by Dr. C. L. Dana.)

117. Recently published mezzotint of William Harvey (by MacArdell after Jansen) from the British Museum collection.

(Kindly lent by the President, Dr. Samuel W. Lambert.)

118. Engraving by H. Leman after R. Hannah of Harvey demonstrating the blood to King Charles I.

(Recently given by Dr. Wm. H. Thomas.)

119. Portrait in oils by Dr. William Harvey, discoverer of the circulation of the blood (1578-1656) by William Dobson (1610-1646).

Portrait V, in Sir D'Arcy Power's book on the Harvey Portraits (see item 84).

(Kindly lent by Dr. Oscar H. Rogers of Yonkers-on-Hudson, N. Y.)

120. Reproduction of portrait of Harvey as an older man. Sir D'Arcy Power finds this the most pleasing picture of Dr. William Harvey. It is now owned by Mrs. Margaret Franck Carr, of Ditchingham Hall, Norfolk, formerly by the Rev. James Franck Bright, D.D., and was inherited from the famous Dr. Richard Bright (1789-1858). Unsigned and attributed to Anthony Van Dyck or William van Bommel. Portrait IX in: *Portraits of Dr. William Harvey*. Published for the Historical Sect. of the Royal Society of Medicine. [Edited by Sir D'Arcy Power] Lond., Oxford University Press, 1913.

121. Reproduction of another portrait of William Harvey as an old man. Illustration in Spencer, H. R. *The history of British midwifery from 1650 to 1800*. London, John Bale, Sons & Danielsson, Ltd., 1927.

The portrait attributed to C. Jansen is in the Kent and Canterbury Hospital. In his old age Harvey turned to mathematics and studied Oughtred's *Clavis mathematica*. Possibly this is the book in the portrait.

HARVEY'S DEATH AND MONUMENTS

122. Picture of Hempstead church.

From: Richardson, B. W. *Disciples of Æsculapius*. N. Y., E. P. Dutton & Co., London, Hutchinson & Co., 1901, i, p. 14. William Harvey died at Roehampton at his brother Eliab's house on the 3rd of June, 1657, and was buried beneath the Harvey Chapel at Hempstead Church, Essex.

123. Picture postcard of the Harvey Chapel.

On St. Luke's Day, the 18th of October, 1883, the leaden case containing Harvey's body was placed in a white marble sarcophagus within the Church. The President and twenty-six Fellows of the Royal College of Physicians were there, the youngest being Norman Moore.

(Lent by the Librarian.)

124. Picture postcard of Dick Turpin's Ring at Hempstead.

Richard "Dick" Turpin (1706-1739) the notorious robber, was born in a house close to the Church. This circle of nine trees forms "Turpin's Ring" and surrounds the site of his cock-fighting.

(Lent by the Librarian.)

125. Reproduction of an original sketch of the Harvey vault made by Bertram Richardson in 1880. Harvey's body was "lapt in lead," no coffin being used. From: Mitchell, S. Weir. *Some recently discovered letters of William Harvey*. . . . Phila. [Trans. of the Coll. of Physicians of Philadelphia] 1912. [Keynes, No. 53.]126. Reproduction of a rubbing from the breastplate of the leaden case; made by Dr. Weir Mitchell (1830-1914) in 1880. In: Mitchell, S. Weir. *Some recently discovered letters of William Harvey*. . . . Phila. [Trans. of the Coll. of Physicians of Philadelphia] 1912. [Keynes, No. 53.]

127. Two reproductions of Harvey's bust in Hempstead Church. (Nos. XVIII and XIX in Sir D'Arcy Power's list, see item 84). The bust is thought to have been made from a death mask.

128. B. W. Richardson's (1828-1896) description of the vault, etc. In: Richardson, B. W. The remains of William Harvey. *Lancet*, 1878, ii, 776.

"William Harvey, at the mention of whose honourable name all academies rise up out of respect, who was the first after many thousand years to discover the circulation of the blood, and so brought health to the world and immortality to himself." (Translation of part of the inscription below the bust.)

129. Picture of the Folkestone statue of Harvey unveiled by Sir Richard Owen (1804-1892) in 1881. Reproduced from an illustration in: Holländer, Eugen. *Plastik und Medizin*, Stuttgart, Ferdinand Enke, 1912, p. 534.
130. Owen, Richard. An address on unveiling the statue of Harvey and its presentation to the town of Folkestone, Sat., Aug. 6, 1881. In: *British Medical Journal*, 1881, ii, 286.

BIOGRAPHIES OF HARVEY

131. [Macmichael, Wm.] *Lives of British Physicians*. London, John Murray, 1830. [Harvey, p. 31.] (The Family library, no. XIV.) Written by Macmichael (1784-1839) author of the *Gold-headed Cane*.
132. Munk, William. *The roll of the Royal College of Physicians of London; comprising biographical sketches*. . . . 2nd. ed. rev. & enl. London, published by the College, 1873. i, 124.
133. Willis, Robert. *William Harvey, a history of the discovery of the circulation of the blood*. London, Kegan Paul & Co., 1878.
134. Power, D'Arcy. *William Harvey*. New York, Longmans, Green & Co., 1898.
The best known life of Harvey. Sir D'Arcy Power is a consulting surgeon to St. Bartholomew's Hospital where Harvey was physician.
135. Norman Moore's (1847-1922) life of Harvey in the *Dictionary of National Biography*, vol. ix.

136. *History of St. Bartholomew's Hospital*, London, C. Arthur Pearson, Ltd., 1918. vol. ii, by Sir Norman Moore, Bt. (1847-1922) who was President of the Royal College of Physicians before he died, opened to show the beginning of the chapter (xx) of fifty-six pages devoted to Harvey.
137. *Life*, by Philip Henry Pye-Smith (1840-1914). In: *Encyclopaedia Britannica*. 9th. ed. 1880, xi, 502-506.
138. Wyatt, R. B. H. *William Harvey (1578-1657)*. London, Leonard Parsons, 1924. (The Roadmaker series.)
139. Power, D'Arcy. Dr. William Harvey as a man and an art connoisseur. In: *Comptes rendus du deuxième cong. inter. d'Histoire de la méd. à Paris, July 1921*, Evreux, Cr. Hérissé, 1922, 452-456.

SOME HARVEIAN ORATIONS

140. Card inscribed:

The Harveian Orations are delivered on St. Luke's Day (October 18th) every year. Until 1865 they were always in Latin, the first being delivered in 1656 by Edward Emily.

141. The earliest Harveian Oration we can find in the Library of the Academy—that of John Freind (1675-1728) the medical historian, etc. (In his: *Opera Omnia*, Paris, 1735.)

Several other important orations are scattered about this exhibition.

142. Halford, Sir Henry, Bt. Harveian oration. 1830.
In his: *Essays and orations*.... London, John Murray, 1833. Append., p. xxxiii.
Sir Henry Halford, Bt. (1766-1844) was President of the Royal College of Physicians of London (1820-1844).

143. Paget, George E. *The Harveian oration, 1866*. Cambridge, Deighton Bell & Co., 1866.

144. Rolleston, George. *The Harveian oration*, 1873. London, Macmillan and Co., 1873.
145. Johnson, George. *The Harveian oration*.....June 24, 1882. London, Smith Elder & Co., 1882.
146. Moore, Norman. *The Harveian oration*.....Oct. 18, 1901. London, John Murray, 1901.
147. Barlow, Sir Thomas, Bt. Harvey, the man and the physician.....the Harveian oration, Oct. 18, 1916. *Lancet*, 1916, ii, 739.
148. Crawford, Raymond. Forerunners of Harvey in antiquity.....The Harveian oration, Oct. 18, 1919. *British Medical Journal*, 1919, ii, 551.

HARVEIANA

149. A book dedicated to Harvey:
 Highmore, Nathanael. *Corporis humani disquisitio anatomica in qua sanguinis circulationem in quavis corporis particula plurimis typis novis, ac aenygmatum medicorum succincta dilucidatione ornatam prosequutus est*. Hagae-Comitis, Samuelis Broun. 1651.
 Highmore mentions that Harvey made dissections at Oxford.
150. An engraved portrait of Highmore (1613-1685).
151. A letter to Dr. Harvey from James Howell.
 In: *Epistolae Ho-Eliae: The familiar letters of James Howell*. Boston, Houghton Mifflin, 1907, p. 164.
 (Kindly lent by the President, Dr. Samuel W. Lambert.)
152. Reference to Harvey and his discovery in Dryden's Epistle to Dr. Charleton. In: Charleton, Walter. *Chorea gigantum or the most famous antiquity in Great Britain vulgarly called Stone-Heng*.....2nd. ed. London. D. Browne Junior, 1725, p. 20.

153. The reference to Harvey and his work in *The Progress of Physic*, attributed to John Arbuthnot (1667-1735) and addressed to J. Baillie, M.D., 2d. ed. London, 1743.

(Kindly lent by Dr. E. J. Rhodebeck.)

154. The Harveian Society of Edinburgh.

It was founded in 1782. An account of it as given in Sir Robert Philip's paper, Relations of William Harvey to Medicine in Edinburgh, *British Medical Journal*, 1926. ii, 1029-1033.

155. The Harveian Society (London).

It was founded in 1831—report of a paper read before it. (In: *Lancet*, 1857, i, 349-350.)

156. The Harvey Society of New York: *The Harvey lectures.....the Harvey Society of New York, 1905-1906*. Phila., J. B. Lippincott, 1906.

"The Harvey Society of New York was organized during the spring of 1905 through the efforts of Professor Graham Lusk." The lectures are published annually.

157. The Harvey Club (London, Ontario).

McIntosh, W. A. Cheselden, anatomist and surgeon. *Canadian Medical Association Journal*, 1926, xvi, 709-712. A paper read before the Club.

158. Card inscribed with quotation from Abraham Cowley's Ode on Dr. Harvey.

This was first published in his *Verses on several occasions*. London, 1663.

159. Moore, Norman. *Gabrielis Falloppii Mulinensis Opera, given to the College by Harvey and formerly belonging to his father-in-law, Dr. Lancelot Browne*. [London. Privately printed], May 14, 1914.

From time to time Sir Norman Moore, Bt., Harveian Librarian for seventeen years, wrote such notes as this and distributed them at dinners

held after comitias of the Royal College of Physicians.

(Lent by the Librarian.)

160. Moore, Norman. *Harvey and the Earl of Totnes* [London, Privately printed]. March 29, 1915. Another note by Sir Norman Moore.

(Lent by the Librarian.)

161. Gold Medal bearing head of William Harvey, 1578-1657.

The reverse has the inscription "International Physiological congress, Edinburgh, 1923."

(Kindly lent by Dr. Alfred E. Cohn.)

162. A leaflet:

Harvey memorial, Rebuilding of the fallen tower, Hempstead Church, Essex. [n.p., n.d.]

It contains a list of the committee of the Harvey Church Tower Memorial Fund and an appeal. Dr. Malloch, the Librarian, will be glad to forward to London any subscriptions which he may receive towards the rebuilding of the fallen tower of Hempstead Church.

(Lent by the Librarian.)

163. The Harvey memorial at Hempstead Church.

In: *Lancet*, 1927, i, 720.

164. Programme of Tercentenary celebration in London: *The Royal College of Physicians of London. Tercentenary celebration of the publication of the De Motu Cordis by William Harvey, 1628. Programme of Arrangements, May 14th-18th, 1928.* [London, printed by Emery Walker, Limited. 1928], 3 pl.

RECENT ACCESSIONS

- American Medical Association. Council on pharmacy and chemistry.
Glandular therapy.
Chic., A. M. A., 1927. 98 p.
- Arzt (Der) in der Karikatur.
Berlin, Stollberg, [1928]. 153 p.
- Baur, H. & Stransky, E. Die klinische Hämatologie des Kindesalters.
Leipz., Deuticke, 1928. 506 p.
- Bethea, O. W. Clinical medicine.
Phila., Saunders, 1928. 700 p.
- de Block, L. Toxicomanies.
Paris, Vigot frères, 1927. 189 p.
- Bousefield, W. R. The basis of memory.
Lond., Kegan Paul, 1928. 132 p.
- Cabanès, A. Le sixième sens (sens génésique).
Paris, Le François, 1927. 259 p.
- Charpentier, P. G. Les microbes.
Paris, Les éditions Rieder, [1927]. 77 p.
- Chavany, J. A. Les tumeurs de la moelle.
Paris, Doin, 1928. 78 p.
- Chondhury, A. K. R. A treatise on kala-azar and its treatment.
Calcutta, Bhattacharyya, 1927. 113 p.
- Cooper, J. F. Technique of contraception.
N. Y., Day-Nichols, [1928]. 271 p.
- Cruchet, R., Ragot, A. & Caussimon, J. La transfusion du sang de l'animal à l'homme.
Paris, Masson, 1928. 106 p.
- Decourt, J. Ataxies aiguës.
Paris, Doin, 1927. 150 p.
- Drew, G. A. A laboratory manual of invertebrate zoölogy . . . 4. ed.
Phila., Saunders co. 1928. 234 p.
- Dublin, L. I. Health and wealth.
N. Y., Harper, 1928. 361 p.
- Dyson, G. M. Chemistry of chemotherapy.
Lond., Benn, 1928. 272 p.
- Examen (L') médical en vue du mariage. (Par Drs. René Sand, Govaërts, Haskovec, et al.)
Paris, Flammarion, 1927. 248 p.
- von Economo, C. Zellaufbau der Grosshirnrinde des Menschen. . .
Berlin, Springer, 1927. 145 p.
- Falta, W. Die Erkrankungen der Blutdrüsen. 2. Aufl.
Berlin, Springer, 1928. 568 p.
- Géraudel, E. Le mécanisme du cœur et ses anomalies.
Paris, Masson, 1928. 285 p.
- Godwin, G. Cain, or the future of crime.
Lond., Kegan Paul, 1928. 108 p.

- Goldschmidt, R. Einführung in die Vererbungswissenschaft. 5. Aufl.
Berlin, Springer, 1928. 568 p.
- Gordon, A. K. Systemic infections.
Lond., Baillière, 1928. 176 p.
- Graves, W. P. Gynecology. 4. ed.
Phila., Saunders co., 1928. 1016 p.
- Gudzent, F. Gicht und Rheumatismus.
Berlin, Springer, 1928. 189 p.
- Haegerty, J. J. Four centuries of medical history in Canada and a sketch
of the medical history of Newfoundland.
Toronto, Macmillan co. of Canada, 1928. 2 v.
- Harman, N. B. Aids to ophthalmology. 7. ed.
Lond., Baillière, 1928. 236 p.
- Harris, D. F. The sixth sense, and other studies in modern science.
Lond., Routledge, 1928. 174 p.
- Heidenhain, L. Ueber das Problem der bösartigen Geschwülste.
Berlin, Springer, 1928. 153 p.
- Hogarth, A. M. British mosquitoes and how to eliminate them.
Lond., Hutchinson, [1928]. 126 p.
- Humbert, L. Modern treatment of varices.
Paris, La revue médicale universelle, [1927]. 93 p.
- Jamieson, P. An introduction to the technique of section-cutting. . .
Edinburgh, Livingstone, 1928. 79 p.
- Joslin, E. P. The treatment of diabetes mellitus. 4. ed.
Phila., Lea, 1928. 998 p.
- Korkhaus, G. Moderne orthodontische Therapie. . .
Berlin, Meusser, 1928. 299 p.
- Kranz, P. Einführung in die Orthodontie. 2. Aufl.
Berlin, Meusser, 1927. 214 p.
- Krisch, H. Die hysterische Reaktionsweise.
Berlin, Urban, 1928. 97 p.
- Laquer, F. Hormone und innere Sekretion.
Dresden, Steinkopff, 1928. 136 p.
- Lee, A. B. Microtome's vade-mecum. 9. ed. by J. Bronte Gatenby &
E. V. Cowdry. . .
Lond., Churchill, 1928. 710 p.
- Lewin, P. A text-book of orthopedic surgery for nurses.
Phila., Saunders co., 1928. 353 p.
- von Luschan, F. Volker rassen Sprachen.
Berlin, Deutsche Buch-Gemeinschaft, [1927]. 382 p.
- Mackie, T. J. & McCartney, J. E. An introduction to practical
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OBITUARY NOTE

ADOPTED AT A MEETING OF THE EXECUTIVE COMMITTEE OF
THE COMMITTEE ON PUBLIC HEALTH RELATIONS,
JUNE 19, 1928

The Committee on Public Health Relations in recording their deep sorrow at the death of Doctor Arthur W. Bingham wish to bear testimony to his enduring contributions to his city, to his profession, and in particular to the life and health of the patients at Willard Parker Hospital, by his determination to bring every benefit of preventive and curative medicine to the problem of the communicable diseases of childhood.

By initiating and carrying forward to substantial completion a rigorous medical accountancy in hospital work he raised the standard of the practice of medicine in this city and set new goals for administrative attainment.

Unsparring of himself in his devotion to the wellbeing of the public charges of the Department of Health, he truly lost his life that others might live.

As a practitioner of his chosen art and science, as a teacher in the laboratory and at the bedside, as an organizer of resources for the helpless and dependent he earned the admiration of his colleagues, the affection of his patients and the gratitude of the community he served.

DEATHS OF FELLOWS OF THE ACADEMY

JOSEPH ALBERT ANDREWS, M.D., 1231 State Street, Santa Barbara, California; graduated in medicine from the College of Physicians and Surgeons, New York City, 1876; elected a Fellow of the Academy October 16, 1884; died, May 6, 1928. Dr. Andrews was a Fellow of the American Medical Association, a member of the American Otological Society, the American Ophthalmology Society, the Heidelberg Ophthalmology Society, the Oxford Ophthalmology Society, and the New York Ophthalmology Society. He was also Consulting Ophthalmologist and Aural Surgeon at City Hospital.

HERMAN LE ROY VON LACKUM, M.D., 104 East 40th Street, New York City; graduated in medicine from the University of Iowa, 1915; elected a Fellow of the Academy November 1, 1923; died, June 30, 1928. Dr. von Lackum was a Fellow of the American Medical Association, Attending Surgeon at the New York Orthopedic Hospital and Assistant Professor of Orthopedic Surgery at the College of Physicians and Surgeons, New York City.

EDWIN HENRY NALL, M.D., Briarcliff Manor, New York; graduated in medicine from the Memphis Medical College, Memphis, Tennessee, in 1892; elected a Fellow of the Academy October 6, 1904; died, July 10, 1928. Dr. Nall was a Fellow of the American Medical Association, and Visiting Physician at Ossining.

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EDITORIAL

NAUNYN'S AUTOBIOGRAPHY¹

When Naunyn came to die, he was defined by his pupil, Magnus Levy, as a man of kingly nature; and, truly, the leonine old gentleman of the portrait prefacing these memoirs might have graced a throne with more strength and dignity than many a monarch we know of. Not so the taut, sharp-eyed, sharp-featured young man of the group further on, a not particularly engaging figure in provincial overcoat and flat billycock hat, fingering the inevitable cigar, more of the hard-bargaining business type than physician-like—the “impudent *Berliner*” of tradition. Haply “best men are moulded of their faults,” and Naunyn’s story conveys, as none other, the enobling effect of medicine, practiced in honor, upon the development of character; for all the pains and labors, the trials and sorrows of an honest physician’s life are in this remarkable book. Like the sudden lifting and dropping of a curtain, the self-contained Nordic gives, at the start, a momentary glimpse of the best side of himself, the weak spot in his armor. And how beautifully he does it!

“One of the men I love is Don Quixote. It has long since been settled that this singular hero is no ordinary fool, but what his creator intended him to be, a very fine gentleman. Perhaps it is even true that every man who is noble-minded, who is not lacking in imagination, has something of Don Quixote in him.”

Appreciation of the meridional by “the nations of the moral North” is apt to be grudging, and Naunyn, when he wrote these lines was worn and world-weary from the

¹ B. Naunyn: *Erinnerungen, Gedanken und Meinungen*. München, 1925.

strain of the setbacks and disappointments attending his last great work, the erection of the big university hospital at Strassburg; but his perception of Alonso el Bueño is as secure and fine as Turgenieff's in the immortal close of "Hamlet and Don Quixote," or, shall we say, as in the glowing finale of Richard Strauss.

In East Prussia, the family "Noynyn" dated back to 1364 and rose out of mechanical employments to the pastor and schoolmaster status, those inevitable "planks to respectability," as Baas has termed them. Naunyn's father, a burgomaster of Berlin, a host and counselor of royalty, well connected all over East Prussia, was serious up to hypochondria, worrying (his son relates) about such non-essentials as the devastating effects of hailstorms upon crops which he himself did not possess. The Berlin of Naunyn's boyhood (the late forties) was, in his own phrase, "a small-town capital," its best residential streets made up of monotonous rows of unattractive houses, going back, some said, to the days of Frederick William I, the cellars of the ground floors used as hutches by very small tradesmen, the sewage discharging frankly into the streets, with continuity of horrific odors in summer and congealed filth in winter. What a contrast to the Berlin of our recollection, clean as a whistle, the standard object lesson of the sanitarian, suggesting the model cities we build at the base of children's Christmas trees, with magnificent ornate suburbs at Wilmersdorf, Charlottenburg and Gross Lichterfelde! The schoolboys of the period were anything but "ducking mice," indeed hardy, obstinate, contentious, conceited youngsters, more than a match for the schoolmaster, yet afraid of "ghosts." Naunyn himself was like that, just a mischievous, natural boy, bent on annoying other people, self-willed, indifferent to studies, a reader of Cooper's novels, and already physically hardened by sticking out long, bitter, winter days of exposure on hunting expeditions. He attributes the straightlaced Puritanism of his mature period to his father and a certain feeling for the finer side of life to an elder sister. Never once did he

regard laziness or lumpish tendencies as "transvaluations" in the Nietzschean sense. He is, in fact, mildly scornful as to the recent pother about preserving the "individuality of the child," which he regards as a poor school for developing character and a sign of weak or degenerated stock. It would require an expert grammarian to parse the formidable sentence at the bottom of page 22, but the sense of it is plainly "spare the rod and spoil the child."

The narrative begins dramatically with the March days of revolution (1848), a period of gunfire and barricades in the streets, a stray shot killing a servant girl in front of the Naunyn doorway on the Linden. The father, then head-burgomaster, takes his children to the barricades, where he addresses the disaffected in vain, spends days and nights in close conference with the king, whom he accompanies on his ride through the town, yet steers such an even course between his natural toricism and the liberal extremists that he is coldly regarded on both sides and is the last to be "decorated." For safety, the family are sent to relatives in big business at Königsberg. Crossing the Weichsel on a lighter, a victoria forces its way on to the craft behind the post-wagon and, driven backward by the rearing of the horses, is hurled, with its driver, into the angry current, to disappear beneath the waves. Quiet in Berlin is not restored until late October. The period up to the accession of Wilhelm I, Naunyn describes as "lethargic," a period of study by tallow dips, when the executioner still broke delinquents on the wheel, when sexual culprits (if women) did penance on platforms, as in the "Scarlet Letter," and when processions of charity boys moved through the streets, singing at doors like Christmas waits. Naunyn is quite frank about the sexual torments of youth and, for various reasons associated with self-development, regards the maintenance of school-boy friendships in after life as dubious, unnecessary and undesirable. Of all his boyhood companions, he retained the regard of but one, whom he had already known from childhood; of his university days, only his body servant, Max Mollard.

The turning point of his life came from a remarkable teacher (Jungk), who awakened his mind by the following train of reasoning: Strength makes might and might makes right, but might is evil in itself and is often imposed as "hereditary." The only way to break the vicious circle is through personal nobility (*Vornehmheit*), i.e., the strong will, of necessity, disdain the baser arts and subterfuges whereby the weak sometimes survive and arrive. The lesson conveyed (*Noblesse oblige*) was little in itself, he says, but it gave him a settled aversion to the arrogance of "ruling classes." He became a Prussian liberal of the extreme left, always voting that ticket. Another leading motive he got from the Church Fathers, *viz.*, the distinction between venial sins, which are temperamental, therefore pardonable, and mortal sins, or evil actions dissociated from temperament, and therefore unpardonable. When he began his university studies, he had already decided for medicine, against the will of his sombre parent, who wanted to make him a public official. He began at Bonn, where he found everything subordinated to the life of the Corps and the *Mensur* (duelling), which disgusted him as whetting artificial hatreds between the Saxon, Prussian and Westphalian students, of which he bore the brunt, in one instance, all his life. Naunyn soon left Bonn for Berlin, where university life was dominated by the sound axiom of Fichte: "A student is one who studies." Here he was most influenced by his anatomical training under Reichert and by the permanent tradition, established by Johannes Müller, that the chief end of university training is investigation, in the sense of working on the confines of knowledge in order to ascertain new facts. Naunyn's particular find, the cilia on the inner surface of hydatid cysts, proved of value to him in his graduating dissertation and subsequently, but he maintains that working over hydatid livers ruined his digestive system forever. In the last semester, he came into the clinic of Frerichs, the great pioneer of what is now called "group-diagnosis," who at once captivated him by his clear, plastic, withal classical presentation of bedside findings and determined

his subsequent career as internist. During his year of voluntary military service, which was not particularly brilliant, Naunyn had himself transferred without difficulty to the Charité, then a part of the army establishment, and having played a highly creditable part in the Silesian typhus epidemic, became Frerichs' clinical assistant for nine years. The strange personal traits of Frerichs—his exaggeration of the distant Nordic attitude, his blank indifference to administration, his easy-going tolerance of students, whom he never nagged or bullied but treated "as if essential organs of his own body," have long become familiar through Naunyn's account of Berlin clinical teaching in the sixties (1908).²

Naunyn once misled his chief, by an alleged diagnosis of Asiatic cholera, and caught no wiggling whatever, but his conscientious, overweening disposition got him into hot water with the administrative chief of the Charité, an old first sergeant, who twice deprived him of his position. In retrieving himself, he proved adroit and alert to a degree, but ethically he had already attained his *consecratio medici*. In the small hours of a winter Sunday, a man was brought into the Charité frozen to death in the streets of Berlin. Intrigued by the fresh, rosy appearance of the corpse, Naunyn worried all night about the case, and at daybreak hurried to the morgue. We have a striking picture of the lonely dead-house in the hard, bright light of a Berlin winter morning, the anxious young physician bending over the corpse, to be reassured by the experienced *Diener* that the fancied heart-beats are merely his own. At the end of his long period in the Charité, came a call to Dorpat, where he became inured to the rigors of Russian winters and lead a pleasurable existence with his associates ("Baltic barons all"), including the celebrated Baer.

At Dorpat, too, he got to know Russia and Russian character at first hand. In 1866 Naunyn participated in the Austro-Prussian Campaign. Much of his time was spent

² Naunyn: *Die Berliner Schule vor 50 Jahren*. Leipzig, 1908.

in trying to find his army corps and field hospital, of which he was for a while the only member—a common experience. When the hospital was assembled, there were no wounded. Life began to hang heavily on Naunyn's hands and he spent the period following the cessation of hostilities in travelling. He took the campaign of 1870-71 very seriously, applied for service at headquarters, but being attached to a Russian University, was told by the Surgeon General to restrain his military ardor, go back to his professional duties and await developments. To his disgust, his passport from Dorpat to Berne was later held up by the Department Commander, on the ground that he had not participated in the hostilities. He gives a striking picture of the ten days of preternatural stillness following the order for mobilization in Berlin. His Dorpat period lasted three years (1869-71), then came a call to Berne (1871-2), where he found an able medical faculty and excellent facilities for clinical teaching. Here he began to realize his personality and to enjoy his academic life, but with the call to Königsberg (1872-88), his troubles began. In spite of certified assurances that he would be provided with suitable clinical material, he met with a frosty reception, with studious intransigence amounting to stiff opposition. Year after year, he had to block a determined movement to take away his polyclinical material, by invoking central authority in Berlin. Irritated by this opposition, he was not particularly diplomatic in social relations and thus added fuel to the flame. All this was changed by his marriage with his cousin Anna, a lady of joyous nature, to whom he devotes several pages of unstinted praise. A long honeymoon spent in travel sufficed to brush away his mental cobwebs and he now began to participate in the larger social life of East Prussia and to acquire an extensive practice, mostly Russian and often necessitating long journeys on consultation into Russia, even to Smolensk. He took up hunting, acquired a lodge at Theerbude in the Rominte forest, near the Russian frontier, spending his summers there until the locality became the hunting preserve of the Emperor (William II).

In the summer of 1887, it began to be rumored that Kussmaul would give up his Strassburg chair and Naunyn was slated to succeed him. The Strassburg period (1888-1904) was a repetition of the Königsberg period. Naunyn found the university clinic spacious, but in wretched condition, and it was stipulated that he was to have a new building. There was again intransigence and intrigue, this time lasting fourteen years, but a call to Vienna, in 1893, was rejected on account of the faulty sanitation of the hospital. When at length, the new clinical institute at Strassburg was opened on February 2, 1902, Naunyn was on the verge of retirement. His opponents did not see, as he ironically observed, that he had really been working for his successors. Recklinghausen, whom he admired and respected, had been a bitter, tyrannical opponent, and after the long, stressful Faculty meetings, poor Naunyn had to take large doses of potassium bromide to quiet his nerves and get a night's sleep. Grave attacks of influenza and appendicitis and an almost fatal bout of pneumonia undermined his health and suddenly he found himself an old man, with diminishing *joie de vivre*, in spite of the temporary rejuvenation occasioned by the completion of his hospital. He retired to Baden Baden, lived through the painful war period and died on July 26, 1925. A physician of splendid character, insight and principle, he had been bitterly penalized in his life by the senseless barbarities of the *medicus medicum odit*.

Naunyn's scientific reputation is based upon his work in experimental medicine, which derived from the great Müller tradition of his Berlin days and from his association with Klebs and Schmiedeberg, with whom he founded the *Archiv für experimentelle Pathologie* (1872). As a clinician, he was keen, able, conscientious, the outstanding exemplar of the Frerichs tradition, but without genius. In clinical teaching, he was at his best, as evidenced by his going, forceful discussion of the subject, which deserves translation. He will always be remembered by his work on metabolism in diabetes, hepatic and pancreatic diseases, which was accomplished in this wise:

The starting point of Naunyn's interest in the role of the liver in metabolism was Frerichs' discovery of leucin and tyrosin, which intrigued his pupils as possible preliminary phases of urea-formation. Naunyn's work on retention of urea (with the excretion of acids and ammonia) in fevers received a mighty impetus from the discoveries of the derivation of urea from ammonia (Schmiedeberg-Schröder) and of the dependence of ammonia-excretion in the urine upon acidosis (Schmiedeberg-Walther) which Naunyn regarded as the pathway into the study of intermediary metabolism in disease. Having demonstrated the dependence of ammonia excretion upon acidosis in man, he found this principle to be best illustrated in the colossal ammonia excretion in diabetes (Hallervorden, 1879). The concept "acidosis" having been established and named, Naunyn put Stadelmann upon the problem of finding the particular acid implicated. After manifold labors, Stadelmann found an enormous deficit of the ordinary known acids, but, by treatment of the syrupy urine with H_2SO_4 , got alpha-crotonic acid, which he assumed to be the unknown substance. But as acetone and aceto-acetic acid were also in the urine, Naunyn pointed out that the real acid activating acidosis must be one which can engender alpha-crotonic acid and the two acetone bodies. By ransacking the Gorup-Besanez text book, Minkowski, Stadelmann's successor, found that this condition is fulfilled by beta-oxy-butyric acid (Külz, 1884), which was actually obtained as a crystalline sodium salt by Magnus Levy, twenty years later. The establishment of acidosis led to Naunyn's scheme of treatment for diabetes, *viz.*, carbohydrate tolerance by exclusion of albumin and meat from the diet. In attempting to exclude the liver for metabolism experiments, Naunyn failed because he chose anastomosis between the portal vein and the right renal vein instead of the inferior vena cava (Eck fistula); but he recalled, from Stannius' Comparative Anatomy, that, in birds, the anastomosis between the cava and portal vein is effected in nature by Jacobson's vein, and put Minkowski on to the problem. Metabolism after exclusion of

the liver was then studied in geese, which led to the study of hematogenic jaundice (formation of bile pigment from hemoglobin without disease of the liver). Naunyn claims the discovery of the Kupffer cells before they were baptized as such and other things of moment, but that, alas, is a weakness of all physicians who have failed to establish priority by publication. To the Strassburg period belongs Minkowski's extraordinary success in experimental excision of the pancreas (pancreatic diabetes, 1899), the first step toward the discovery of insulin.

As an exhaustive personal exposition of modern phases of clinical investigation and teaching, closing with these problems on all sides, Naunyn's autobiography is unquestionably the most important book in the literature of medicine, a book which would be better known, had it been provided with a serviceable subject-index. It is of very unequal merit, much too long and apparently written at odd intervals, in varying moods, with the usual Germanic disregard for literary style. One has only to contrast the abrupt, sometimes ambiguous sentences of the opening chapter, with the graphic pages on winter journeys into Russia, the Mazurian lakes, the hunting grounds of the Rominte Heath, the sand-dunes of the Kuhrischen Nehrung or the enthusiastic rhapsodies on Italian travel and Bayreuth opera. The tone is intensely serious throughout, with a few stray purple patches of humor here and there. The anecdotes related by the talented wife of the ophthalmologist, Julius Jacobson, are highly entertaining. As Fräulein Haller, she had been a beautiful diva, in fact the Venus of the Weimar performances of Tannhäuser, which role she realized to plenitude. In the darkness of the vanishing scene at the end of the Bacchanale, she found herself assailed by a species of ecstatic manhandling which necessitated the loud cry for help. The lights on, the culprit was revealed as none other than Richard Wagner, whose physical equipment for dazzling the fair consisted in an overly large head over a "bag of bones" framework. He offered the usual lame excuse, that he was "really paying her a great compliment." In later years,

Lilie). One can understand Naunyn's concern to elucidate the Nordic temper of his master, who after years of devotion, suddenly turned upon his pupil with acrimony; but to tattle about the lady (who had done him no harm) seems a thought spiteful. Try him, however, at his best, on a Russian journey, or in the deep forests on the Russian frontier or the Mazur:

"The poetry of solitude shed such a glory about our little house on the heath that my remembrance of it seems fabulous. In Christmas week we usually fled our family troubles, arriving at Theerbude late in the evening. After an hour's walk through the dim woods, we stood before our tiny shack, standing out brightly in the gloomy night, with gigantic icicles depending from the roof, while all about was snow and dark forest; or again, we sat silently together of autumn evenings, to the murmuring of the boughs, the mournful hooting of the white owl, until, at length, like the roaring of lions, the ominous baying of stags in rut made the windows rattle! All about us free, untamed nature and we the lords of the lonely heath!"

Lacking the large world-outlook which Humboldt and Haeckel, Darwin and Huxley acquired by travel in the far East and West, Naunyn was really made for a life of this kind, his natural offset to the narrow, coercive, proselyting spirit which goes with small-town origins. The passion of his professional career was for clean, spacious hospitals and adequate clinical material for teaching students, but he was never diplomatic or clever in attaining these ends and, with the exception of Vienna, he was never offered a first-class university chair. A standing invitation to successive meetings of the British Medical Association was rejected annually because the specification "Lodging with breakfast, without dinner" seemed to reflect upon his "competence as a guest." The intention of the practical English—that the "guests" were expected to meet colleagues by invitation at specially arranged dinners and lunches—utterly escaped him. He thought gatherings of men superficial and valueless. Without the ladies, there

was a tendency to talk shop and to rehearse the inevitable outworn, outlawed "stories," which stirred his ire like "the obligato chiming of *Ueb' immer Treu' und Redlichkeit* every quarter of an hour from the belfry of the garrison-church at Potsdam."

Late in life, Naunyn learned to respect form in writing and speaking and concludes that speeches and papers for important occasions should be carefully written out and read from manuscript, since "facile extempore speaking makes for thoughtless verbiage." He believed that the practice of medicine is no more of an "art" than the practical applications of physics or mathematics, since our supposed clinical "intuitions" are really conditioned by knowledge and experience and "wherever science leaves off, we are upon shaky ground. The 'intuitions' of the ignorant are pure fantasies." Hostile as Osler to the idea of marriage for young medicos, he was remarkably successful with students and was stampeded by them on only one occasion, which he coolly disposed of in a few patient sentences. "The good students," he would say, "one must not take their praise or blame too seriously. To lose one's head by getting angry with them is fatal."

The signed profile photograph of Naunyn which hangs in the Surgeon General's Library, a picture taken in middle life, has been much admired, as conveying his rugged, veracious character—

"Here's John the Smith's rough-hammered head. Great eye,
Gross jaw and griped lips do what granite can
To give us the crown-grasper. What a man!"

At the beginning of his book, he flatly declines to romance about his youth: *Solchen Missbrauch der "seltsamen Tochter Joris" mache ich nicht mit.* The best of Naunyn—his firm character, his honorable nature, his active, scientific intelligence, his well-ascertained culture, his steadfast devotion to duty, his uncompromising love of truth—is in that sentence.

F. H. GARRISON.

THE GRADUATE FORTNIGHT OF THE NEW YORK ACADEMY OF MEDICINE

OCTOBER 1ST TO 14TH, 1928

The Problem of Aging and of Old Age will be the topic of the first Fortnight and will be discussed from many angles. Particular consideration will be given to the early recognition and prevention of disturbances which are often the underlying causes of aging. The program will include morning, afternoon and evening sessions each day.

The profession generally is invited to attend.

No fees will be charged for attendance at any of the meetings or clinics on the program.

The day and hour on which each clinic is to be held will be announced in a later program.

Copies of the complete program will be mailed upon request.

SESSIONS IN TEACHING HOSPITALS

Special courses and clinical lectures and demonstrations have been arranged in more than thirty of the teaching hospitals of the city (9 to 12 a.m. and 2 to 4 p.m.). For the purposes of the Fortnight the hospitals of the city have been divided into three groups. The hospitals of each group will present programs similar in character and scope so that it will be possible for the physician to spend a full day in the hospitals of one section of the city and thus avoid the necessity of making long trips between hospitals.

Among the subjects which will be presented in the hospital programs are:

Asthma	Functional Diagnosis	Pathology
Arthritis and	Gastro-Enterology	Physical Therapy
Orthopedics	Gynecology	Pneumonia and
Blood Chemistry	Hypertension and	Infectious Diseases
Bronchoscopy	Nephritis	Proctology
Cardiology	Neoplasms-Cancer	Radiology
Dermatology and	Neurology	Surgery
Syphilology	Ophthalmology	Traumatic Surgery
Diabetes	Otolaryngology	Urology

SESSIONS AT THE ACADEMY OF MEDICINE

During the Fortnight there will be two sessions daily at the Academy, one in the late afternoon (5 to 7 p.m.), the other in the evening (8:30 to 10:30 p.m.). Supper will be served at the Academy for those desiring it.

The manner in which the general subject will be presented is indicated in the following arrangement of the program:

General Considerations

- October 1st—The doctor—Trainer or healer? Doctor George E. Vincent, President, Rockefeller Foundation.
October 1st—Old age and what it means to the community. Doctor Louis I. Dublin, Statistician, Metropolitan Life Insurance Company.
October 4th—The pains, penalties and prohibitions of old age. Sir Farquhar Buzzard, Regius Professor Medicine, Oxford.

The Heart and Bloodvessels

- October 3rd—The aging of the heart muscle regarded from a general biological point of view, Doctor Alfred E. Cohn, Rockefeller Institute.
October 11th—Angina pectoris, Doctor Harlow Brooks, Professor of Clinical Medicine, New York University.
October 10th—Hypertension, Doctor Herman O. Mosenthal, Director Department of Medicine, Post Graduate Medical School and Hospital.
October 3rd—Practical preventive medicine, Doctor E. J. G. Beardsley, Associate Professor of Medicine, Jefferson Medical College.
October 11th—The myocardium, Doctor John Wyckoff, Clinical Professor of Medicine, New York University.
October 9th—Diseases of the arteries of the extremities, Doctor Leo Buerger, Attending Surgeon, Bronx Hospital.

The Digestive Tract

- October 12th—Digestive problems, Doctor Thomas R. Brown, Associate Professor of Clinical Medicine, Johns Hopkins University.
October 12th—Liver and biliary passages, Doctor Franklin W. White, Instructor in Medicine, Harvard University.
October 5th—The conditions of the rectum in old age, Doctor Jerome M. Lynch, Professor of Rectal and Intestinal Surgery, Polyclinic Medical School and Hospital.

The Respiratory Tract, Infectious Diseases and Climate

- October 8th—Pneumonia in old age, Doctor Lewis K. Neff, Director Medical Service, Harlem Hospital.

October 8th—Bronchitis and asthma, Doctor Frederick T. Lord, Visiting Physician, Mass. Gen. Hosp.

October 8th—Tuberculosis and old age, Doctor Lawrason Brown, Saranac Lake, New York.

October 8th—Climate and the aged, Doctor Gerald B. Webb, Colorado Springs, Colorado.

October 11th—Infectious diseases and old age.

Surgical Problems—Bones and Joints

October 1st—The treatment of arthritis deformans of the hip, Professor Vittorio Putti, Istituto Ortopedico Rizzoli, Bologna, Italy.

October 5th—Osteomalacia and Paget's disease, Doctor Edwin Allen Locke, Clinical Professor of Medicine, Harvard University.

October 10th—Arthritis and old age, Doctor Russell L. Cecil, Visiting Physician, Bellevue Hospital.

October 5th—Traumatic surgery and the problems of age, Doctor John J. Moorhead, Professor of Surgery, Post Graduate Medical School and Hospital.

Pathological Processes, Neoplasms, X-ray and Radiology

October 2nd—Importance of anatomical pathways in diseases of middle life and old age, Doctor Harrison S. Martland, Pathologist, City Hospital, Newark, New Jersey.

October 9th—Special aspects of neoplasms in the aged, Doctor James Ewing, Professor of Pathology, Cornell University.

October 1st—Carpenter Lecture. Family variations in cancer susceptibility, Doctor Alfred S. Warthin, Professor of Pathology, University of Michigan.

October 9th—X-ray and radium in the problem of old age, Doctor Francis Carter Wood, Director of Radiological Therapy, St. Luke's Hospital.

General Care, Dietetics, Pharmacology

October 2nd—Clinical aspect and management of old age from the practitioner's point of view, Doctor Charles F. Collins, New York City.

October 4th—Dietetics in old age, Doctor Samuel A. Brown, Professor of Pharmacology, New York University.

October 4th—Pharmacology in old age, Doctor Alexander Lambert, Visiting Physician, Bellevue Hospital.

October 4th—Alcohol in old age, Doctor Samuel W. Lambert, President, The New York Academy of Medicine.

October 2nd—Postponement in the individual process of aging, Doctor Linsly R. Williams, President, New York Tuberculosis and Health Association.

October 5th—Food and food habits, Doctor Solomon Strouse, Associate Professor of Medicine, Rush Medical College, University of Chicago.

Syphilis and Diseases of the Skin

- October 2nd—Syphilis in elderly persons, Doctor George M. MacKee, Professor of Dermatology and Syphilology, Post Graduate Medical School and Hospital.
- October 2nd—Diseases of the skin in old age, Doctor Howard Fox, Professor of Dermatology and Syphilology, New York University.

The Brain and Nervous System

- October 9th—Aging of the human brain, Doctor Frederick Tilney, Professor of Neurology, Columbia University.
- October 9th—Apoplexy, Doctor Bernard Sachs, Consulting Neurologist, Mt. Sinai Hospital.
- October 3rd—Arterial diseases of the brain and cord, Doctor Foster Kennedy, Professor of Clinical Neurology, Cornell University.
- October 3rd—Spinal cord diseases, Doctor Edwin G. Zabriskie, Attending Physician, Neurological Institute.
- October 8th—Psychoses in old age, Doctor Menas S. Gregory, Director of Psychopathology, Bellevue Hospital.

The Ductless Glands, The Menopause

- October 4th—The relation of disorders of the ductless glands to senescence, Doctor William Engelbach, Engelbach Clinic, St. Louis.
- October 4th—Menopausal and post-menopausal conditions in women, Doctor Benjamin P. Watson, Professor of Obstetrics and Gynecology, Columbia University.

The Biology of Old Age

- October 3rd—The mechanism of senescence, Doctor Alexis Carrel, Rockefeller Institute.
- October 11th—The Harvey Lecture. Senescence and rejuvenescence from a biological standpoint, Professor C. M. Child, University of Chicago.
- October 10th—Present status of the problem of the so-called rejuvenation, Doctor Charles R. Stockard, Professor of Anatomy, Cornell University.

The Kidneys and the Genito-Urinary Tract

- October 10th—Nephritis in old age, Doctor Nellis B. Foster, Associate Professor of Medicine, Cornell University.
- October 5th—Urology, its contacts with general medicine, Doctor Joseph F. McCarthy, Director of Dept. of Urology, Post Graduate Medical School and Hospital.

Eye and Throat

- October 12th—Diseases of the eye in old age, Doctor William H. Wilmer, Professor of Ophthalmology, Johns Hopkins University.
- October 12th—Carcinoma of the larynx, Doctor John E. MacKenty, Senior Surgeon, Manhattan, Eye, Ear and Throat Hospital.

PAPERS DELIVERED AT STATED MEETING
MAY 17, 1928

THE RELATION OF FOCAL INFECTION TO
CHRONIC ARTHRITIS

RUSSELL L. CECIL

Perhaps I should apologize for speaking on such a threadbare subject as focal infection, but it is a problem in which I have been very much interested for a number of years, and it seemed to me it might be worthwhile to go over some of the evidence on this still so-called theory, and see just how we stand on it at the present time.

Those of you who are old enough will recall that as far back as 1910 Frank Billings began to write about the importance of foci of infection in arthritis and neuritis. In the same year D. J. Davis studied foci of infection bacteriologically in nephritics and arthritics. Later E. C. Rosenow produced arthritis experimentally in rabbits with streptococci isolated from foci of infection in man. In Germany, Kirschman, Koch and others called attention to the importance of tonsillectomy in arthritic patients with diseased tonsils. Barker in Baltimore was also very much interested in this subject and stressed the importance of removing infectious foci in arthritic patients.

The prominence of these men attracted a great deal of interest to this subject and it became a popular theme for discussion. When I was graduating from medical school focal infection was very much before the profession and had a great wave of enthusiasm as many of you, no doubt, remember.

In contrast to this I would like to refer to some recent history. I went over to Philadelphia about two or three months ago to a meeting of the Rheumatism Committee. At that meeting there were men from various parts of the country—students of arthritis and several orthopedic surgeons. One of the subjects that came up for discussion was

the terminology of chronic arthritis and I argued for calling it, as many people do now-a-days, chronic infectious arthritis instead of rheumatoid arthritis or atrophic arthritis. But to my surprise I found a strong sentiment against this term in this committee of eight or ten gentlemen. They said, "How do you know that it is infectious?"

That was a question that rather stunned me. I thought that every one had assumed it to be infectious. I was actually voted down in this committee meeting on calling the chronic arthritis with swelling and deformity chronic infectious arthritis. They voted to call it chronic atrophic arthritis.

Why has this reaction come about? There is undoubtedly a large element in the profession to-day who look askance at focal infection. I will venture to say a good many of these men are orthopedic surgeons and men who see arthritic patients late in the disease. Now it is a fact that the removal of foci of infection late in arthritic infection has very little influence on the disease, that is, in most cases. It is only when foci are removed early that we get satisfactory results.

Another reason for the reaction against focal infection is the failure to classify our cases. The students of arthritis are pretty well agreed that all cases of chronic arthritis should be divided into two main groups, the infectious migratory type with swelling of the joints which occurs mostly in younger people, and the degenerative arthritis that comes late in life and is characterized by bony and cartilaginous changes.

We have been very much interested in this classification of arthritis at the Cornell Clinic and we are convinced that the second type which occurs in old age is non-infectious and is not dependent in any way on focal infection. This, of course, is a hard thing to prove. In studying these cases of degenerative arthritis—old ladies with creaky knees who are usually overweight—the lesions appear to result from the strain and wearing out of the joint from trauma

or too much weight. This type of arthritis is not associated, as a rule, with foci of infection. These old women of fifty-five or sixty have usually lost most of their teeth, any way, and the tonsils are small and atrophied and show no signs of infection.

Undoubtedly, there has been, in the past, too much pulling of teeth and removal of tonsils in this type of arthritis. Patients and physicians have been disappointed, and that, no doubt, has accounted for some of the reaction against focal infection.

In the infectious type of arthritis, on the other hand, we usually do find foci and if these are removed early the patient is generally benefited by the operation.

Let us now discuss briefly the location of foci. Of course, the commonest is in the tonsils or the teeth. Third should come sinuses. Then we have the bronchi, genital tract, gastro-intestinal tract, urinary tract, etc. In our studies at the clinic we have found the tonsils to be by far the commonest focus of infection, thus agreeing with most other people who have worked along this line. We have estimated sixty-five to seventy per cent. of our cases of arthritis are associated with diseased tonsils. Next in frequency are the teeth with apical abscesses, twenty-five to thirty per cent. That leaves a comparatively small number of cases that are caused by the other foci, such as sinuses, gall bladder, etc. The gall bladder, by the way, is not an unusual focus. We have seen several cases where chronic cholecystitis existed, and with the flare-ups of acute symptoms in the gall bladder, there immediately appeared symptoms in the joints. As the gall bladder quieted down the joints also subsided.

Twenty years ago Billings said he had found very few cases of chronic arthritis associated with intestinal infection. That has been our experience. We should say, however, that with chronic ulcerative colitis, arthritis could be associated with probably some etiological connection.

It is interesting to note that in our analysis of 200 cases of infectious arthritis, the patients with infected tonsils were decidedly younger than those with infected teeth. That, of course, was to be expected, because tonsillitis is a disease of young people, whereas root abscesses occur in later life when teeth begin to deteriorate.

What constitutes a diseased tonsil? A tonsil, of course, with pus in it, as opposed to a tonsil with only cheesy material in it. I am always suspicious of a large tonsil. I am suspicious of a small, red, congested tonsil, associated with redness and congestion of the anterior and posterior pillars.

What constitutes a diseased tooth? That is a still more difficult problem. Rosenow teaches that every dead tooth is a menace and actually harbors streptococci in the canal, and he advocates the extraction of all dead teeth (regardless of X-ray findings) in patients with chronic arthritis. It seems to me that this is a radical position and one very few of us would care to take. We all carry around devitalized teeth and would not like to part with them, even if we have occasional arthritic pains. These teeth should not be disturbed unless the X-ray shows some definite signs of periapical infection. Furthermore, we must not expect to find pus in these abscesses always. Many of them show only granulation tissue.

But what is the real evidence for this focal infection theory? We still must call it a theory, for it has not been absolutely proved. What is the evidence to support this theory? The first is, I should say, by analogy. We have the most perfect type of focal infection in gonorrhea, when an acute or sub-acute gonorrheal infection in the prostate and seminal vessels is followed by an arthritis and gonococci are found in these joints. This is the prototype of focal infection, a local infection with metastatic infection in the joints. If this happens in gonococcus infections, there is no reason why it could not happen in infected tonsils or infected teeth of streptococcal origin.

Perhaps a stronger argument still for the focal infection theory is just from experience. Those who have worked a great deal with arthritis have seen so many patients relieved by the prompt and early removal of foci, that it is impossible not to believe that some actual etiological connection exists between the focus and the infected joint.

I am not going to tire you with a lot of case reports, but I want to cite three or four typical cases. For instance, here was a little girl three years old with chronic infectious arthritis, sometimes called Still's disease. Her case was not advanced. For six months she had had swelling of the knees, ankles and wrists. The fingers and the knees were held slightly flexed. A very bad prognosis had been given the mother by a prominent pediatrician in this city. The little girl showed tonsils that did not look particularly bad nor particularly good. The laryngologist that saw them advised tonsillectomy. We agreed, and she made a complete recovery in nine months. In nine months from being an invalid and unable to walk she was completely cured, and had no residual stiffness or deformity in any of these joints.

There are several cases where the focal infection was very obscure and where some difficulty was found in locating it. A spinster, aged forty, with chronic arthritis, duration two years, had symptoms in the knees, back, shoulders, later in the hands and feet. There never was a great deal of swelling. She had had tonsillectomy one year after onset. The teeth were negative. A hysterectomy for fibroids was performed three years ago, one year before the onset of arthritis.

Examination showed a pin-hole hymen which when opened revealed a large retention of pus. This being drained, the patient made a complete recovery. Evidently the vaginal infection was subsequent to the hysterectomy, causing a chronic sluggish infection there in the vagina.

Trained nurse, aged twenty-nine. Tonsils out six years ago. Teeth negative. One and a half years ago onset. One year ago several fingers began to swell. At the time of the

first examination knees, fingers and left foot were swollen. No evidence of any infection around the nose or throat. This patient was quite a problem. She did not respond to any of the usual forms of treatment. She had some symptoms of appendicitis. We took the appendix out, with no help. She came in a year later with redness in one eye and some obscuring of vision. She was found to have iritis. She was referred to a laryngologist who discovered a sphenoidal sinusitis. It was drained and eighteen months later she was back on duty.

The third case was also a spinster, aged forty-two. Tonsils out six years ago. One dead tooth. X-rays of teeth negative. Six months ago she had a uterine polyp removed. Two weeks after the operation she developed a polyarthritis with swelling. Physical examination showed swelling of the ankles and knuckles, elbows tender. The uterus was suspected, but the gynecological report was negative. Six months later the patient reported some vaginal discharge. She was again sent to a gynecologist and this time he reported purulent infection of Bartholin's gland. The gland was dissected out and she made a rapid recovery.

Here is a final case. A man, aged forty, salesman, chronic polyarthritis with swelling for six months. After treatment in a neighboring city for several months without success, he came to New York where pus was found in the urine. Cystoscopic examination showed pus coming out of the right ureter. To make a long story short, gravel and pus were found in the discharge. The right kidney was removed and the patient made a complete and uneventful recovery and went back to his business.

These are rather unusual foci and indicate that the discovery of the focus of infection is not always easy. Very often the tonsils have been removed before any arthritis is felt. In other cases the removal of the tonsils gives the patient no relief. So we have to make very careful and exhaustive searches for the concealed foci.

Now, as to the bacteriology of these foci of infection. Davis in his early studies rather leaned toward the streptococcus hemolyticus. As you know, various organisms are found in the tonsils; indeed, several types of streptococcus. We have the green streptococcus, the indifferent streptococcus (streptococcus that produces neither green nor hemolysis), and the hemolytic streptococcus.

The early workers felt the hemolytic streptococcus was responsible for the joint changes. It seemed to be the most virulent, and it readily produced arthritis in rabbits, but one could also produce arthritis with the green streptococcus, and the green streptococcus produced an arthritis more like that in patients. The hemolytic streptococcus experimentally injected in animals usually produces a suppurating type of arthritis.

What other organisms can produce this infectious form of arthritis we are not prepared to say, but certainly the burden of evidence goes to show that the streptococcus is responsible for most of them.

But are the joints in chronic infectious arthritis actually infectious, or are they simply toxic phenomena? Some of you may have heard Dr. Swift's paper in Washington two weeks ago in which he suggested that the joint manifestations in rheumatic fever might be allergic in character. These patients are extremely sensitive to streptococcus protein, and when the protein is injected intravenously they have a reaction very much like a positive tuberculin reaction. It may be that the joint manifestations are due to hypersensitiveness to the streptococcus protein. This is a point which has not yet been cleared up.

During the past year we have been finding some rather interesting things in our chronic arthritides at Bellevue and in the Cornell Clinic. We have been taking blood cultures on these cases and we found to our surprise that by using a certain technique, green streptococci could be isolated in quite a large number of cases right from the blood.

This is done by taking cultures from the blood clot. Another feature of the technique is not opening the cultures for ten days to two weeks after inoculation. They are allowed to incubate without disturbance for at least ten days.

Suffice to say, that by using this technique green streptococci can be recovered in seventy-five to eighty per cent. of all cases of chronic infectious arthritis with swelling or actual deformity of the joints. They are not present in controls; they are not present in other types of arthritis. We have studied forty-five cases of chronic arthritis of the infectious type and about fifty controls, and so far we have had negative results in all control cases.

We have also cultured the joints themselves in six cases of chronic infectious arthritis, not simply by puncture but by taking actual material from the joint. These joint cultures are rather interesting. In two of the joints we were able to get curettings of bones and cartilage. They were cases which for some reason or other had come to orthopedic surgery for correction. Two of these cultures then were from bone curettings and the other four were from synovial membrane. The four cultures from synovial membranes were sterile but the two from the bone curettings gave green streptococci. Both of these patients in whom green streptococci were found in the hip joints had green streptococci also in the circulating blood.

There are several possible explanations of these findings. In the first place, we must naturally ask if they are contaminations. The streptococcus is an unusual contamination. Most laboratories find staphylococci, hay bacilli and diphtheroids the commonest form of contamination. We don't expect to get the green streptococcus as a contamination. Another point against their being contaminations is that they were not found in the control cases. They were not found in quite a large series of non-arthritis and healthy individuals. Then, these streptococci when injected in rabbits in small doses produced a very beautiful non-suppurative arthritis. We have not followed it long enough to say whether or not it will end in deformity.

Certainly when these streptococci are injected intravenously they very soon set up a non-suppurative, proliferative arthritis in rabbits.

Another explanation would be that they are in the blood but have no significance. Streptococci undoubtedly do get into the blood from time to time. They have been reported in measles, and probably in acute tonsillitis. It is conceivable that they might be circulating in the blood in chronic arthritis, but had no connection with the disease. However, it would seem very strange to have in the blood bacteria capable of producing arthritis if they did not have some etiological relationship to the joint lesions.

Another explanation would be that they were related indirectly to the joints. That is, the joints might be allergic lesions but not actual infections.

Finally we might assume that the green streptococci came from some focus of infection and were actually responsible for the joint lesions. That seems to me the most probable and the simplest explanation of the picture.

Of course, we are wondering where these streptococci emanate from. Most of the patients had the tonsils removed at the time blood cultures were taken. Where do these streptococci come from? Do they come from the nasopharynx or the intestine? Are they located in the lymph glands or in the spleen? They come out irregularly. In some of the patients we have taken repeated blood cultures. Sometimes they are positive and sometimes negative. They are not there all the time. I presume this might explain the flare-ups which these patients have, feeling comfortable one week and very uncomfortable the next.

Rosenow, twenty years ago, isolated green streptococci from the lymph glands in cases of chronic infectious arthritis, and recently this work has been verified at Johns Hopkins by Baehr and his co-workers.

Now, just a word in regard to the treatment of foci of infection. I have already mentioned the time factor. I

don't think it has been sufficiently stressed in the past. There has been too much of a feeling that all that had to be done in chronic arthritis was to take the focus out and the patient would get well. It all depends *when* these things are done. It certainly is a great mistake to allow foci of infection to stay in with the idea that the patient under hygienic measures and drugs or vaccines is going to get well with the focus still in his body. The fact is, he may get better, or well; but he is going to have recurrences. One of the characteristic features of this disease is its tendency to recur. As long as the focus remains, this tendency will manifest itself. We found in a large number of cases that in patients who were cleaned up during the first year a very high percentage got well, whereas, in those who came in after four or five years of arthritis and were then cleaned up, the removal of foci had no effect at all on the course of the disease.

One of the questions most often debated is whether apparently normal tonsils should ever be removed. I think the answer is, under certain circumstances, yes. The very frequency with which chronic tonsillitis and chronic arthritis are associated justifies their removal if, after careful search, no other focus can be found.

As I said before, the teeth should be carefully gone over and abscessed teeth removed; but beware of too much radical treatment of teeth in elderly people who have degenerative osteoarthritis, because in such cases, pulling teeth is rarely going to do good. If a number of teeth are to be extracted it is better to remove one or two at a time than to take them all out at one sitting. It has been found from experience that extraction of five or six teeth at once is apt to bring on acute exacerbation of symptoms. The sinuses have to be studied very carefully, especially the ethmoids and sphenoids. It is very easy to overlook infection in this particular location. After the removal of foci, of course, we resort to various measures, drugs, physiotherapy and vaccines, preferably autogenous. Of course, we are trying out vaccines made from these blood-stream streptococci.

Some patients are extremely sensitive to them and the dosage has to be small in the beginning.

Osgood believes in a vitamin diet for the arthritic. He gives them fresh vegetables, fresh fruit, cod liver oil, etc. He argues that in chronic arthritis, there is a depletion of calcium in the bone leading to the characteristic atrophic changes in the bone, and he reasons that by using a high vitamin diet and sunlight on these patients, the calcium can be driven back into the bone, with presumably a great deal of benefit to the patient. Osgood does not use vaccines, but depends almost entirely on hygienic and orthopedic measures. Rest, fresh air and sunlight are most important, and particularly rest. Pemberton stresses rest very much in all of his writings.

I think the climate is a big factor, one unfortunately that we can't resort to as much as we would like. Patients who can afford it may be sent out to Arizona where there are a number of sanatoria at the present time, and in that dry hot atmosphere they make recovery much more rapidly than in our moist climate here. Unfortunately Arizona is a long way off, and very few patients can afford to make such a trip. If they must stay in this climate it is probably better to get them into the mountains where there is less humidity and where they can get the benefit of a high dry atmosphere.

THE PROGRESS OF SPECIFIC THERAPY IN PNEUMOCOCCUS PNEUMONIA

HORACE S. BALDWIN

The specific therapy of pneumococcus pneumonia made little headway until Cole, Avery, Chickering and Dochez at the Hospital of the Rockefeller Institute used pneumococcus Type I serum in the treatment of pneumococcus Type I pneumonia. This was reported in 1917. These investigators showed that by giving adequate amounts of serum and instituting treatment early, the mortality rate could be

cut. A Type II immune serum was also used, but with no apparent beneficial effects. Due to the necessity of giving intravenously large doses of serum and the severity of serum sickness that followed, this form of therapy has never received any large and general use.

The next step was the elaboration by Huntoon in the Laboratories of the Mulford Company of an almost serum-free extract of pneumococcus antibodies for Types I and II. Here again there were factors that militated against its general use and effectiveness. In the first place, the concentration of the antibodies was small, especially for Type II, and the frequency of severe chill reactions was too great for safety.

In 1924 Felton of the Department of Hygiene of Harvard University began to extract the antibodies for pneumococcus I and pneumococcus II from immune horse serum, very greatly diminishing the amount of horse serum present, and greatly increasing the concentration of antibodies.

Since 1924 this concentrated extract has received considerable clinical trial at Bellevue, Boston City, Harlem and the New York Hospitals. The frequency of chill reactions associated with its use has been markedly reduced until to-day the great majority of the lots produced by Felton are free from any severe deleterious chill substance. Also, and of great importance, the concentration of the antibodies has been greatly increased.

Felton now expresses the concentration of his product in terms of units. A unit of antibody is ten times the smallest amount of antibody that will protect a mouse against 100,000 fatal doses of a highly virulent culture. A fair idea of the progress he has made in concentration may be given if one realizes that whereas an immune Type I or Type II whole serum, to pass the Federal regulations, must contain 50 units per c.c., Felton has been able to make a Type I concentrate that contains 4,000 units per

c.c., and a Type II concentrate that contains 1,200 units per c.c.

In addition to increasing the concentration and minimizing the frequency and severity of the chill reaction, a polyvalent Type I and II serum is now being used, thus lessening the delay in giving antibody at once to a probable Type I or Type II pneumonia. Thus far, little progress has been made in the production of a Type III concentrate and no clinical trial has been carried out. As for the heterogeneous Type IV group, we are still far from any specific form of therapy, although investigations into the possibility of subdividing this group are in process.

Since the work of Cole and his associates, considerable has been done in determining the rationale and the effectiveness of specific therapy in pneumococcus Type I and pneumococcus Type II pneumonia. Numerous investigators have shown the severity of bacteremia in pneumonia, and the high mortality associated with its presence. At Bellevue Hospital we were able to show the good prognosis associated with the natural development of protective antibodies during pneumonia and the apparent antibacteremic effect produced when sufficient amount of protective substance either in whole serum or concentrates was introduced artificially.

Avery and Heidelberger have been able to show that the pneumococcus *in vitro* and *in vivo* produces a specific soluble substance which has large powers of neutralizing immune bodies. This has great importance in relation to the problem of specific therapy, as has been shown by several investigators, most recently by Park and Cooper. As for animal experimentation, Cecil's work with experimental pneumonia in monkeys shows clearly the specific effect of pneumococcus antibodies and suggested strongly the usefulness of antibody treatment in humans.

FELTON CONCENTRATE TREATMENT

1926—1928

THE NEW YORK HOSPITAL

<i>Type</i>	<i>Control Cases</i>		<i>Treated Cases</i>	
	<i>Number</i>	<i>Died</i>	<i>Number</i>	<i>Died</i>
I	11	2	10	1
II	13	6	17	2
III	4	3	5	2
IV	20	6	22	4
	—	—	—	—
Total	48	17 (35.4%)	54	9 (16.6%)

The above statistical record shows the results obtained in a control series of cases at the New York Hospital during the past two years and also the results obtained in the cases receiving Felton's concentrated Type I and Type II antibody. Although the number of cases is not large, we have felt that the results have been consistently good for the two years and probably present a reliable picture of the value of Felton's concentrate in the treatment of Type I and Type II pneumonia.

Our dosage of antibody at the New York Hospital has been very high, much higher than that recommended by Park and Cooper in a recent report. With the high dosage we have observed marked clinical improvement in the Type I cases. In the Type I case that died we were unable to give a very high amount of a Type I concentrate, due to the patient's marked tendency to severe chills.

In the Type II cases, the results have been extraordinarily impressive. One of the two treated cases that died was a patient who entered the Hospital in a diabetic coma and with signs of infection. The blood culture revealed pneumococcus Type II, but because of the vagueness of his physical signs no antibody was given during the few hours that he remained alive in the Hospital. It was only on autopsy that a definite consolidation was ascertained. He is entered on the "treated" series because of our strict

numerical sequence in determining the control and treated cases. The other Type II case died during the winter of 1926-1927, at a time when the concentrate for pneumococcus Type II was of relatively low potency. Among the Type II cases that recovered were two with a positive blood culture previous to the administration of the Type II antibody.

In conclusion, the work of the past five years has resulted in a solution of concentrated antibody for pneumococcus Types I and II pneumonia which is very high in potency. Chill reactions are becoming infrequent. Clinical results are now being obtained, the lack of which at the start often made the administration of pneumococcus Types I and II antibodies such a discouraging procedure.

It is still necessary to stress the importance of early treatment and undoubtedly the best results will be obtained with the use of antibody extract of high unit value in large amounts, early in the course of the disease.

THE BORDER LINE OF ETHICS

The rules adopted by the Medical Society of the State of New York which establish the ethical standards for the medical profession in this state are fairly broad but define specifically acts which are unprofessional. These rules of ethics are devised primarily to protect the patient and the public and not, as some prominent laymen think, to protect the medical profession alone.

In a recent article in the *American Mercury*, Nathan criticizes the profession and in particular the consultant who tells the patient's relatives that the family physician is a very competent one and to continue his plan of treatment, when the consultant believes that the family physician is incompetent.

The question of the competence or incompetence of the family physician is one which is decided with the greatest case by the layman but only with the greatest difficulty by

the physician. Who can determine whether or not a physician is competent when the state has been satisfied with his qualifications and has permitted him to practice his profession without supervision, trusting entirely to his intelligence and ability to act always in the best interests of his patients? On the other hand, the consultant may enormously shake the confidence of the family in their physician by "changing the entire line of treatment," simply by recommending a drug with a new name which has the identical effect of the drug being used by the family physician.

It does not seem possible to agree with this layman's contention but the medical profession does know that some physicians are more skillful than others and that occasionally some of them are very unskillful. Even the ablest, most intelligent and most conscientious of all make sad mistakes.

There seems to be no immediate corrective of this situation but the medical profession can point with pride to the constant improvements in the standard of medical teaching and the raising of the requirements to practice and the enormous addition to scientific knowledge that is available for the cure and relief of patients.

Advertising by the medical profession is unethical and is so because when one individual physician advertises, the public assumes that he has something to offer which cannot be offered by other physicians and successful advertising is usually associated with exaggeration and the medical profession believes that medical advertising produces unfair competition which will result in a deterioration of medical practice for the people and loss of prestige and influence to the medical profession.

In some sections of the country, the use of physicians' cards and the printing of a notice of the name and address and type of practice in the local press is considered ethical. It is not so considered in New York State, but is occasionally done.

The announcement of the removal of a physician's office is usually mailed by the physician to all his patients. This is entirely proper. Is it ethical, however, to send a notice of the removal to those who are the patients of others? Is not this really advertising? It is considered entirely proper to announce the removal of one's office in a medical publication but does it not exceed the bounds of propriety to announce the removal of one's office in the lay press or in special magazines or house organs?

In former years, it was considered unethical to own an interest in a drug store or pharmaceutical establishment but it is not now considered unethical for a physician to own an interest in a large manufacturing establishment for the production of medical and surgical supplies and pharmaceutical preparations. On the other hand, it does exceed the bounds of propriety to stimulate the use of drugs manufactured by a particular company for the purpose of increasing one's own profit or the profit of one's friends.

It is hoped that the members of the medical profession will feel required to observe not only the letter of the rules of ethical procedure but will also comport themselves voluntarily in a manner which is more dignified and proper than the simple observance of ethical procedures.

During the past few years Fellows of this Academy have been criticized for actions which have not been proven to be violations of the code of ethics. But in some instances, however, they have exceeded the bounds of propriety which are necessary to uphold the dignity and prestige of the institution.

LIBRARY NOTES

RECENT ACCESSIONS

- Arneth, J. Die speziellen Blutkrankheiten im Lichte der qualitativen Blutlehre.
Münster i. Westf., Stenderhoff, 1928. v. 1.
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ANNOUNCEMENT

In October there will be an exhibition in the Library of books on old age and diseases of old age.

DEATHS OF FELLOWS OF THE ACADEMY

FREDERICK ERNEST D'OENCH, A.B., M.D., 114 East 54th Street, New York City; graduated in medicine from Strassburg University, Strassburg, Germany, in 1879. Dr. D'Oench was elected a Fellow of the Academy June 2, 1887; he died July 14, 1928.

MEYER L. RHEIN, M.D., D.D.S., 38 East 61st Street, New York City; graduated from Albany Medical College, Albany, New York, in 1880; elected a Fellow of the Academy February 4, 1886. Dr. Rhein was a Fellow of the American Medical Association; he died July 16, 1928.

LUCIUS DUNCAN BULKLEY, B.A., M.D., 121 East 60th Street, New York City; graduated in medicine from the College of Physicians and Surgeons, New York City, in 1869; elected a Fellow of the Academy January 8, 1874; died July 20, 1928. Dr. Bulkley was a Fellow of the American Medical Association.

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EDITORIAL

MEDICAL PROVERBS, APHORISMS AND EPIGRAMS

Proverbs, as terse, net summations of folk-wisdom, are supposed to emanate from the heart of the people; but like the first rock paintings of prehistoric man or the rude beginnings of folk-music, they were inevitably the product of a few individuals of superior intelligence within the tribal group. Conceived mathematically as a mode of energy, like heat, light or electromotive force, mind obviously cannot function *via* dispersed groups but only through an individual unit. *A fortiori*, the genuine products of mind never emanate from crowds, activated by "herd instincts" of the most rudimentary order. The celebrated dictum of Gabriel Tarde, that "the collective intelligence of a crowd is less than that of any one of its individual members" is a hard proposition for the sentimental to digest, but it explains many of the mishaps which have befallen humanity and to which it is still liable. Were crowds activated by collective "intelligence," the political changes wrought by the French and Russian Revolutions would have been effected without violence and with a minimum expenditure of energy; there would have been no World War, and "organization" for business or military enterprises would be superfluous. Crowds may be trained but they cannot think. A mob in an emotional state is, in the accurate view of the Italian Campanella, "a beast with muddy brain," and this condition is likely to remain constant as long as man remains man. It is for this reason, as Renan says, that humanity has been so frequently "betrayed by its leaders." When the Scotch clansmen spoiled a movement they did not fancy, by melting away from it, the "crowd" happened

to be made up of hard-headed, close-reasoning units, each operating on his own initiative and responsibility.

The first thing noticeable about folk proverbs is their strong family likeness in space and time. Dealing, as they do, with the fundamental needs and instincts of humanity, they necessarily run to pattern, are concerned with a limited number of basic principles of action and conduct, which crop up monotonously in the remotest regions, under the strangest guises. The next most remarkable thing about them is their extraordinary pungency and cynicism, the harsh wisdom of the countryside, whether around an African kraal, a roadside farm in Jugo-Slavia or on a Siberian steppe. The jabs and jibes at women, for instance, are as cruel and direct as those of the old dramatists or the cynics of the 18th century. Folk proverbs are the bitter fruits of tribal experience, crystallized into word-of-mouth literature by some spirit keener than the rest, the most salient example conceivable of Cowper's (and Herbert Spencer's) distinction between wisdom and knowledge. And here, thrown at the start upon his own bare resources, the primitif is at one with the great physician-philosopher who originated the humoral pathology:¹

"We mortals are no kings
For each of whom to sway
A new-made world upsprings,
Meant merely for his play;
No, we are strangers here! the world is from of old.

Born into life!—in vain,
Opinions, those or these,
Unalter'd to retain
The obstinate mind decrees;
Experience, like a sea, soaks all-effacing in.

This is not what man hates,
Yet he can curse but this,
Harsh Gods and hostile Fates
Are dreams! this only is—
Is everywhere; sustains the wise, the foolish elf."

¹ Matthew Arnold: *Empedocles on Etna*. The line of thought in this drama is derived from the poetic fragments of Empedocles and Parmenides. What Swinburne calls "the long and lofty chant of Empedocles" is a kind of breviary or *credo* of the individualized Greek physician of the period.

City-bound people, standardized as to ways and means by the social and economic forces which bring them into the world, feed, clothe, shelter, tend and bury them, have no such rugged wisdom as this, usually emanating from infertile, sparsely settled areas and suggesting the startling relation which Lowell noted between the observations on life in the classics and their daily confirmation in the files of the morning newspaper. Let us begin for example, with the folk-proverbs of West Africa:

Filthy water cannot be washed.

Silence is might.

Law-makers—law breakers.

Loss of teeth and marriage spoil a woman's beauty.

Pus (scandal) will not flow from a boil you do not have.

Poison should be tried out on a frog.

The looks of a dog betray his pedigree.

A dog that refuses to eat garbage will go hungry.

The crane said to his children: out with you!

A coward will never accomplish great things.

Why worry? To be divorced does not mean to die.

The head of a guinea fowl carries no burden.

A letter has only half the value of a personal call.

Peace is made by the edge of the sword.

The back of a chicken does not mind mosquitoes.²

Water never loses its way.

A talkative bird will not build a nest.

To call a dog do not carry a stick.

Big elephants often have small tusks.

A bloodsucker will always manage to live.

An easy life is the death of valor.

If you pass the same tree twice, you may be sure you are lost.

The child of a leopard will be a leopard.

No slave can free another.

A cripple will rarely bring shame upon himself.

A butcher who does not bathe is not patronized.

No monkey makes fun of another.

The hut of a bachelor is never free from evil odors.

No sane man will parade with a stolen goat.

Put the meat away and you'll get rid of the flies.

² In some parts of Continental Europe, reduction of malaria has been attempted by surrounding habitations with live stock, to draw the *Anopheles* away from human skins.

As close observation of life goes, a great general, statesman, scientist or captain of industry could not have done better. We have emerged from the realm of supernatural causes, the Mumbo Jumbo bogies of the tribesmen, into the world of reality. Things are brought down to brass tacks. Some important biological findings of recent vintage are clearly stated and we begin to sense the force of Renan's dictum: *La science est roturière*. The horizon is of brass and iron, with never a lift into the blue for the human spirit. Such keen perceptions of actuality could only originate, as we have said, through some superior intelligence within the tribe. Contrast these, now, with the folk-wisdom of a more advanced and specialized civilization, that of Japan.

A cheap purchase is money lost.

A fog cannot be dispelled with a fan.

He who makes the first bad move always loses the game.

A knowledge of the sacred books is the beginning of sorrow.

What is quickly learned is soon forgotten.

Even the lords of hell bow the knee to the fat purse.

Every man carries a parasite somewhere.

Only the poor give alms to the poor.

Even the dog of a great man wears a proud look.

Lend money to a city, never to a man.

Not all married women are wives.

If a man is poor and humble, even his own wife and children will despise him.

A man's character depends upon whether he has good or bad friends.

Deceive, but don't insult the rich and powerful.

It is easier to rule a kingdom than to regulate a family.

A beaten soldier fears a reed.

A man learns little from victory but much from defeat.

Under a strong general there are no feeble soldiers.

Here we have already advanced several stages in sophistication; we are no longer concerned with the bare essentials of existence but are dealing with a highly organized and very old civilization. In the case of France, a civilization not so old but which has aged more rapidly, it is significant that nearly all the current proverbs of consequence are actually the work of famous men of letters. The rest are merely replicas of the common stock of folk-wisdom of other nations:

The absent are always in the wrong.
A good lawyer is a bad neighbor.
Lazy people are always anxious to be doing something.
The unfortunate are easily wounded.
It is a very vicious animal; if attacked, it will defend itself.
When a man begins to reason, he ceases to feel.
The head of a fool never whitens.
The destiny of nations depends upon what they eat.
It is to our faults that we owe our virtues.
One bad general is better than two good ones.
A life run by rules is but a prolonged mode of disease.
He who complains most is not the most hurt.
Wounded conceit never forgives.
The daughters of the poor are their revenge upon the rich.
Weakness is more opposed to virtue than vice itself is.
To tell stories is the sign of a commonplace mind.
Fear creates gods; boldness makes kings.
There is something in the misfortunes of our best friends which is not displeasing to us.

By contrast, the Irish proverbs have the charm which comes of an easier going, gentler, more tolerant, humorous, whimsical, and, by the same token, more poetic outlook on life:

Hills look green that are far away.
To address a head without knowledge is like the barking of a dog in a green valley.
The stars make no noise.
God is not as severe as He is said to be.
A sweet tongue is seldom without a sting to its root.
The daughter of an active old woman makes a bad housekeeper.
The seekin' for one thing will find another.
A long disease doesn't tell a lie; it kills at last.
He is scant of news that speaks ill of his mother.
A meeting in the sunlight is lucky and a burying in the rain.
A chance shot will kill the devil.
In youth we have our troubles before us; in age, we leave our pleasures behind.
A spender gets the property of the hoarder.
A big belly was never generous.
A wild goose never laid a tame egg.
Better be idle than workin' for nothing.
It's better to be lucky than wise.
The fox never found a better messenger than himself.
Women are stronger than men; they never die of wisdom.

The same tendency is noticeable in the proverbs of Spain, e.g., the case of the famous donkey "who died of other people's troubles." The folk-saws of England, Scotland and Germany get down to bed rock again. What a wealth of physiological observation is implied, for instance, in the English proverb, "Coarse mothers have comely children," or the German, "*Schöne Leute sterben leicht*" (Beauty is easy to kill) or "*Unkraut vergeht nicht*" (Weeds never die). Physical sturdiness may be perpetuated in families, but, apart from other factors, it actually takes a definite amount of substance and many foot-pounds of potential energy to create physical good looks; and we should marvel at the generation of the beauties of old time could we but see the strange saurians and pterodactyls who begat them. The decline of individualized beauty was noted several decades ago and the advent of the period of universal prettiness can be verified on the streets of any city to-day. "Many's the thing can be made for the penny" said the auld Scots wife when she saw the poor black boy. The medical interest of folk-proverbs is, thus, not so much in pathological, as in physiological and psychological observations, the things an observant physician notes by the way in his practice. As is plain from the various collections of medical folk-lore, the actual wisdom of the people with reference to the healing art is apt to be poor stuff. The people are, in fact, the main supporters of quackery, and modern quackery, as Sudhoff affirms, is but a theft from the most ancient phases of folk-medicine.

Dr. Wang Chi Min, of Hangkow, has latterly published an interesting series of 300 Chinese medical sayings and proverbs,³ some emanating from popular wisdom, others allocated to authors or medical texts. In these, which may be taken as fairly representative of the medical wisdom of China over many centuries, the popular adages are, curiously enough, of practical (clinical) import; the literary are concerned mainly with prognosis and medical philosophy.

³ Wang Chi Min: Rep. North Manchurian Plague Prev. Service, Tientsin, 1926, V, 300-315.

POPULAR SAYINGS

The unlucky doctor treats the beginning of an illness; the fortunate doctor the end.

The appearance of a disease is swift as an arrow; its disappearance slow, like a thread.

When a disease relapses, there is no cure.

Nine out of every ten men have piles.

Out of ten persons, eleven have the itch.

Rather marry a leprous wife than eat chicken reared by a leper.

A wife's leprosy does not pass over to her husband.

If a child is constantly sick, it is due to overfeeding.

In a dangerous illness, call in three doctors.

It is easy to get a thousand prescriptions, but hard to get one single remedy.

Feed a dysentery; starve a typhoid.

In typhoid, treat the beginning; in consumption, don't treat the end.

For colic, get the bowels open.

Rather treat ten men than one woman.

No good doctor should enter the house of a crooked official.

To take one leg of a fly is equivalent to a strong purge.

Diarrhœa is a river-fish complaint.

Before thirty, men seek disease; after thirty, diseases seek men.

LITERARY APHORISMS

A good doctor is equal to a good premier. Lu Chi.

The doctor controls life and death. Shi Chi.

Men worry over the great number of diseases; doctors worry over the small number of remedies. Pien Chiao.

To become a good doctor requires breaking the arm three times. Tso Chuan.

Wide reading increases knowledge of disease: some clinics give experience in diagnosis; repeated tests make properties of drugs better known. Ch'u Shih.

When a disease reaches the heart, no medicine can cure. Tso Chuan.

A disease often gets worse after having been a little better. Han Shi.

The sage does not treat those who are ill, but those who are well. Su Wen.

The able doctor acts before sickness comes. Liu Kung Cho.

When you treat a disease, first treat the mind. Chen Jen.

You can remove the trouble, if you know the cause. Mo Tzu.

A dirty cook gives diarrhœa quicker than rhubarb. Tung-Su Pai.

To avoid sickness, eat less; to prolong life, worry less. Chu Hui Weng.

Intermarriage of blood relatives affects the offspring. Shih Pai.

Here, in spite of rather hazy semeiology and prognosis, we have, at length, something approaching the tendency

of the Hippocratic aphorisms; but to compare the two is to realize that Greek medicine is the true starting point of modern medical science. For convenience of readers, the following arrangement of outstanding sentences from the total Hippocratic Canon has been allocated, in each case, to the bilingual of Littré, the references to the French translation being across the page:

SENTENCES FROM THE HIPPOCRATIC CANON

The physician who is also a philosopher is godlike (Littré, ix, 232-233).

The highest duty of medicine is to get the patient well; of several effective remedies, choose the least sensational (iv, 312-13).

Wherever the art of medicine is loved, there also is love for humanity (ix, 258-9).

Physicians are many in title but few in reality (iv, 638-9).

The physician whose mistakes are negligible wins my unqualified praise (i, 590-91).

Life is short, art is long, occasion fugitive, experience fallacious and judgment difficult (iv, 458-9).

Where the physician can do no good, let him do no harm (ii, 634-71).

Natural forces within us are the true healers of disease (v, 314-15).

To do nothing is sometimes a good remedy (iv, 172-3).

The art of medicine consists in three things, the disease, the patient and the physician. The physician is the servant of the art and the patient must combat the disease along with the physician (ii, 636-7).

Science begets knowledge, opinion ignorance (iv, 642-3).

Timidity shows want of power, temerity want of art (iv, 640-641).

For extreme diseases, extreme remedies (iv, 462-3).

Medicine originated through sheer necessity, for the sick did not, and do not, profit by the same régime as the healthy (i, 572-3).

I also maintain that clear knowledge of natural science can be acquired from medicine alone (i, 620-621).

An important phase of medicine is the ability to appraise the literature correctly (iii, 100-103).

In the cities, medicine is the only calling in which errors are penalized by disgrace alone, and that does not hurt those who are familiar with it (iv, 638-9).

In athletes, extreme stoutness is dangerous (i, 3).

Use strengthens, disuse enervates (iii, 324-5).

Use and wont insure the best manual training (vi, 90).

Nature needs no instruction (ix, 112-13).

The human soul develops up to death (v, 314).

Nothing is ever lost [in nature], nor does anything originate which did not exist before (vi, 474).

For grave diseases, the most exact treatment is the most effective (iv, 462-3).

One must know to what diseases the natural disposition of the body inclines (v, 488).

Work is necessary to health (vi, 468).

Never work when hungry (iv, 474-5).

Let exercise come before meals (v, 314-15).

Bloodletting should be done in the springtime (iv, 592-3).

Sudden exertion is harmful to the sedentary (vi, 582).

Spontaneous lassitude indicates disease (iv, 470-71).

Overeating brings on illness, as shown by the treatment (iv, 474-5).

Fat persons are more exposed to sudden death than the slender (iv, 482-3).

Liquid diet is a better restorative than the solid (iv, 472-3).

Light diet is indicated at the height of an acute disease (iv, 464-5).

Insensibility to great pain shows that the mind is affected (iv, 470-71).

The lethargic have slow pulse (v, 610-11).

Those who swoon frequently, and without apparent cause, are liable to die suddenly (ii, 41).

A brusque answer from a modest patient is a bad sign (v, 522-3).

Autumn is bad for consumptives (iv, 490-91).

Labored sleep in any disease is a bad sign (iv, 470-471).

Sleep following upon delirium is a good sign (iv, 470-71).

Rain waters are naturally the best, but they need to be boiled and purified from foulness (ii, 36-37).

Observe head wounds from a distance and without touching them (ii, 21).

When life was seen to ooze away in wounded people, the blood was naturally mistaken for the soul of man (vi, 40-41. *Æneid*, ix, 349).

There should be no dressing for wounds except alcohol, for in wounds, the dry state approximates to the healthy and the moist to the unhealthy (vi, 400-401).

Of simultaneous pain in two places, the lesser is obliterated by the greater (iv, 482-3).

What drugs do not heal, surgery heals; what the knife does not heal the cautery heals; what the cautery does not heal is incurable (iv, 608-9).

Spasm supervening upon a wound is dangerous (iv, 532-3).

As a rule, the outward appearance and characteristics of people are an effect of their native soil (ii, 90-91).

Change of climate is endurable in chronic diseases (v, 318-19).

Most Scythians become impotent, do women's work, live and converse like women (i, 76-77).

Gout in young men comes only from sexual dissipation (vi, 30).

Old persons have fewer diseases than the young but chronic diseases never leave them (iv, 480-83).

Fasting is most easily endured by old people, next by adults, next by the young people and least of all by children, particularly the most lively (i, 13).

Prognosis is uncertain in acute diseases (iv, 474-5).

Spinal deformity often coexists with cough and tubercle of the lungs (iv, 180-81, 574-75).

The incidence of phthisis is commonly between the ages of 18 and 35 (iv, 534-5).

For hysterical maidens, I prescribe marriage, for they are cured by pregnancy (viii, 468).

Hiccough disappears upon sneezing (iv, 566-7).

The breathing (of Philiscus) was rare and large, like that of a person recollecting himself (ii, 684-5).

Diarrhœa in phthisis is bad (v, 14).

Epistaxis in amenorrhea is good (iv, 544-5).

Hardening of the liver in jaundice is bad (iv, 574-5).

If a convalescent eats heartily, yet does not take on flesh, it is a bad sign.

I have never seen people over fifty recover from renal disease (v, 344).

Concussion of the brain is always accompanied by loss of speech (vii, 58)?

Wine is not good in delirium (vi, 218-19).

Good wine will dissipate hunger (iv, 476-7).

Honey and wine were made exquisitely for men, if taken at the proper time and in just measure (vi, 270-71).

An intelligent person must know how to help himself in disease, bearing in mind that health is the highest good of man (vi, 86, 87, 208-9).

Things sacred should be imparted to sacred persons only; and it is not lawful to impart them to the profane until they have been initiated into the mysteries of the science (iv, 642-3).

Aristotle is interesting as the standard-bearer of the Hippocratic tradition that from medical reasoning came the principles of scientific method. As the greatest biologist of antiquity, he illustrates the remarkable aptitude which physicians have continually displayed in sciences other than the medical.

ARISTOTLE

It is the business of a scientist to know the causes of health and disease, whence it follows that most scientists regard medicine as the goal of their studies, while physicians who practice in a scientific manner begin the study of medicine with natural science (*Æsthetics*, Introduction).

Conscientious and careful physicians allocate causes of disease to natural laws, while the ablest scientists go back to medicine for their first principles. (*Æsthetics*, Terminal).

The ablest physicians attach most importance to an exact knowledge of the human frame. (*Nichomachean Ethics*, i. 13).

To cure oneself by the book is bad and an experienced physician far preferable. For he acts not from personal views or any thing unreasonable, but heals the patient and expects to be paid for it. Politicians, acting from personal likes and dislikes, mistrust doctors as likely to compass their deaths

in the service of enemies and so they prefer healing out of books. The physician himself, if sick, actually calls in another physician, knowing that he cannot reason correctly if required to judge of his own condition while suffering. (*De Republica*, iii, 16).

Very important for the conduct of a life devoted to science are the views of Aristotle in his three treatises on ethics. In the *Nichomachean Ethics*, the reasoning is as follows:

Human good is happiness. The highest happiness lies in divine wisdom. Human happiness turns upon practical prudence and virtue. Pleasure lies in activity (motion) and is a physical state turning upon activity of the soul. The soul is rational and irrational. Moral virtue is rational when irrational desires are subjected to reason. Intellectual virtues are two: practical deliberation (prudence, common sense) and scientific speculation (wisdom).

In the *Eudemian Ethics*, good fortune is irrational and continuous (divine impulse) or discontinuous (deliberate action); gentility is the control of desire by reason for the sake of honor.

In the *Magna Moralia*, good fortune becomes lawless nature (*alogos physis*), but to the gentleman, really good things are good, really honorable things honorable.

Consciously or unconsciously, the following were literally the leading motives in the blameless lives of such great physicians and biologists as Harvey and Malpighi, Darwin and Huxley, Johannes Müller and Helmholtz, Claude Bernard and Pasteur:

Happiness, then, stands not in amusement; in fact, the very notion is absurd of the end being amusement, of one's toiling and enduring hardship all one's life long with a view to amusement alone . . . but to amuse oneself with a view to steady employment afterwards, as Anacharsis says, is thought to be right; for amusement is restful, and men want rest because unable to labor continuously. (*Nichomachean Ethics*, x, 6).

Now, he who works in accordance with, and pays observance to pure intellect, and tends this, seems likely to be in the best frame of mind and dearest to the Gods; for if, as we think, any care is given to things human by the Gods, it must be reasonable to suppose that they take pleasure in what is best and most akin to themselves (and this must be pure intellect); and that they requite with kindness those who love and honor this the most, as paying observance to what is dear to them, and as acting rightly and nobly. And it is quite obvious that the man of science chiefly combines all

these; he is therefore dearest to the Gods, and it is probable that he is at the same time most happy. Thus, on this view also, the man of science will be most happy. (*Nicomachean Ethics*, x, 8).

Celsus is best appreciated in full length excerpts. The following sentences, selected and arranged by A. Védrenes, *a medical officer in the French Army*, reveal the literary quality of this great text, but show no great advance over Hippocrates.

CELSUS

Greek medicine once comprised three kinds, viz., one dealing with cures by food (Dietetics), the second with drugs (Pharmaceutics), the third by operation (Surgery). Proæmium.

The art of healing has no more solid base than experience. Proæmium.

Other things being equal, a friend as physician is better than a stranger. Proæmium.

Medicine is a conjectural art which is sometimes supported by neither theory nor practice. Proæmium.

Appreciation of the cause sometimes puts us on the track of the remedy. Proæmium.

The art of medicine has almost no constant rule. Proæmium.

Transition from a safe to a harmful climate, or *vice versa*, is not without danger (i, 3).

Changes in one's mode of life should be made gradually (i, 3).

An idle existence is hazardous, for some day one may have to work (i, 3).

Change of occupation may be fatiguing, and is remedied by resuming one's original employ (i, 3).

Always aid the organ which suffers most (i, 3).

There are some individual constitutions, of which nothing may be predicted without knowing them (ii, 2).

We should not impute the faults of the physician to his art (ii, 6).

Better an untried remedy than none at all (ii, 10).

For major ill, major remedies (ii, 11).

Nothing helps indisposition so much as an opportune diet (ii, 16).

There is no recovery which does not owe more to good fortune than to art, whence medicine is helpless where Nature withholds her aid (iii, 1).

It is more excusable for a physician to fail in acute than in chronic diseases (iii, 1).

Asclepiades said that the physician should heal safely, promptly and agreeably (iii, 4).

Boldness often wins where prudence fails (iii, 9).

There are four diagnostic signs of inflammation: redness and swelling, heat and pain (iii, 10).

The doctor's perseverance often triumphs over the disease (iii, 12).

If the illness is grave, a true phthisis, it should be combatted immediately, for once established, it is not easily subdued. If strength permits, a change

of air by a sea-voyage may be tried, say from Italy to Alexandria . . . Milk is also very proper to take (iii, 22).

Extreme peril authorizes many measures which should be rejected under other circumstances (iii, 18).

Only a charlatan will exaggerate the gravity of an insignificant ailment in order to puff his own importance (v, 26).

In medicine, rules may be absolute, but consequences are variable (vi, 13).

Better a ray of hope than abject despair (vii, 16).

Why should a remedy be certain because it is unique? (vii, 23).

Frivolous minds, possessing nothing, sacrifice nothing; but a great genius honors itself by admitting error, particularly when with the object of forwarning posterity as to the mistakes of predecessors (viii, 4).

Galen was not remarkable for concision, indeed, was often "inebriated with the exuberance of his own verbosity." His *longueurs* are nowise the "heavenly lengths" which Schumann found in the divine music of Schubert, but are frankly boresome. A few sentences will suffice to show him at his best :

GALEN

Nature did not consider size or shape in varying the structure of organs, nay, structure was determined by difference of function and function is regulated by essential utility. *De usu partium*, vi, 9.

The physician is Nature's assistant. *De humoribus*, i.

Most physicians are like athletes who aspire to victory in the Olympic games without doing anything to deserve it; for they praise Hippocrates as first in the art of healing but make no attempt to resemble him. *Medicus Philosophus*.

He who cannot classify diseases as to genera and species will be deceived as to therapeutic indications. *Ibid.*

There are three sentences of the Alexandrian Herophilus which have made their fortune. The first, showing just what it means for a human being to lose his health, was cleverly versified by the English poet Gay, and is, in effect, the very *raison d'être* of medicine.

HEROPHILUS

To lose one's health renders science null, art inglorious, strength effortless, wealth useless and eloquence powerless.

Medicines are nothing in themselves, if not properly used, but the very hands of the gods, if employed with reason and prudence.

He who can discriminate between the possible and the impossible is the wisest physician.

The following sentences, translated by Dr. John D. Comrie (Edinburgh) from the *Regimen Sanitatis*, illustrate the practical dietetic wisdom of the School of Salerno:

Do you wish to be strong and healthy: then shed anxious cares, hold it vulgar to be angry (*irasci crede profanum*), be sparing of wine, sup in moderation, let it not seem useless to rise after a feast, avoid the noonday nap, retain no urine, be not costive. Observe these well and you will live long. Failing doctors, let these three be your doctors: a joyous disposition, rest, a well-regulated diet.

The quaint couplets of Ambroïse Paré illustrate the knack of terse, practical counsel which usually characterizes the surgeon:

PARÉ

Better a tried remedy than a new fangled one.
Those who work hard escape many kinds of infirmities.
Always give the patient hope, even when death seems at hand.
When youth is wakeful and old age drowsy, death is nigh.
To bed is best for foot, leg or thigh trouble.
When gangrene is pronounced, nothing will help but the knife.
I dressed him: God healed him.

A few sentences from Sydenham will convey his quaint literary quality, and these contain some of his basic ideas:

SYDENHAM

The art of medicine is to be properly learned only from its practice and exercise.

Nature, in the production of disease, is uniform and consistent, so much so, that for the same disease in different persons, the symptoms are for the most part the same; and the selfsame phenomena that you would observe in the sickness of a Socrates, you would observe in the sickness of a simpleton.

A disease, however much its cause may be adverse to the human body, is nothing more than an effort of Nature, who strives with might and main to restore the health of the patient by the elimination of the morbid humor.

Fever itself is Nature's instrument.

The generality have considered that disease is but a confused and disordered effort of Nature, thrown down from her proper state and defending herself in vain.

Simply to enumerate all the symptoms of hysteria would take a long day, so many are they. Yet not more numerous than varied, proteiform and chameleonlike.

Gout, unlike any other disease, kills more rich men than poor, more wise men than simple. Great kings, emperors, generals, admirals and philosophers have all died of gout.

A man is as old as his arteries.

The *lues venerea* was introduced into Europe A. D. 1493 from the West Indies, it being, before that time, unknown, even by name. Hence the disease is usually considered as endemic to the American colonies. In my mind, however, it is rather referable to the coast of Guinea, or to some portion of the Negro country thereabout. . . . The African disease is called yaws.

It is not without reason that Aristotle has observed that melancholy men are men of highest genius.

Dabblers in science lean upon the opinion of the vulgar and so have things their own way, whilst closer observers are received with calumny and ill words. Such, however, they bear with equanimity, satisfied with the approval of a wise minority.

As, indeed, no man can say who it was that first invented the use of clothes and houses against the inclemency of the weather, so also can no investigator point out the origin of medicine, mysterious as the source of the Nile. There has never been a time when it was not.

The great physicians of the 18th Century were more remarkable for sustained elegance of diction and conventional views of things than for aphoristic wisdom. It is convenient to take a long jump to a group of medical men who, about the middle of the 19th century, stated, in clear and unmistakable terms, the ideas which were to be the point of departure of scientific medicine, namely, Virchow, Helmholtz, Claude Bernard and Huxley. In a small pamphlet of 1849 Virchow⁴ announced radical and very startling doctrine. In his later utterances, he is more the sceptical man of the world, experienced in practical politics and of extraordinary versatility.

VIRCHOW

Science in and for itself is nothing, and only becomes something through its promoters, the people. The phrase "science for its own sake" smacks of that inhuman viewpoint in which man regards his soul as the ultimate reality, as his essential existence, manifesting itself as a spirit striving to obtain a corporeal existence.

The touchstone of true science is power of performance, for it is a truism that what can, also will, and thus attains to real existence.

⁴ Virchow: *Die Einheitsbestrebungen in der wissenschaftlichen Medicin*, Berlin, 1849.

What is dark and incomprehensible attracts some minds more than what is clear and understandable.

As long as vitalism and spiritualism are open questions so long will the gateway of science be open to mysticism.

Belief begins where science leaves off and ends where science begins.

Belief cannot be reckoned with in terms of science, for science and faith are mutually exclusive.

The task of science is not to attack the objects of belief but to stake out the limits of the knowable and to center consciousness within them.

Spontaneity of thought and freedom of will, as characteristics of our species, are illusions of human pride; for even savages know that, from birth on, there is naught but unconscious reflexes and instincts.⁵

Humanism is neither atheistic nor pantheistic, since it has but one formula for things unknowable, namely: I do not know.

Anthropomorphism is the attempt to reduce philosophic dualism to unity and this *anabasis* commonly follows the familiar pathway of unscience, that of analogy: Its postulates are God as a magnified man and the attribution of infinite dimensions to the human mind.

From the basic error that specific remedies were created for particular diseases came the notion that the whole course of a disease, or even its separate stages, could be annihilated by a single remedy. It was reserved for the ablest physicians of all time to perceive that identical remedies are good only for identical phases of different diseases and that for different phases of the same disease, different remedies are necessary.

Should medicine ever fulfill its great ends, it must enter into the larger political and social life of our time; it must indicate the barriers which obstruct the normal completion of the life-cycle and remove them. Should this ever come to pass, medicine, whatever it may then be, will become the common good of all. It will cease to be medicine and will be absorbed into a body of knowledge which is identifiable with power.

be accomplished fact: What seemed causal in exercise.

The art of medicine is to exercise. worth in shedding the cothurnus and mixing

Nature, in the production of disease, acquires new powers. so, that for the same disease, the remedies of the poor and no small part of most part the same; and the physician's jurisdiction.

in the sickness of a Socrates, the power of monarchy and the *Junker* in order to simpleton. the shield.

A disease, however much its cause is for the leucocytes. is nothing more than an effort to and for that very reason concede rights to to restore the health of the patient

Fever itself is Nature's instrument, insurance for its perusal.

The generality have considered it serves to indicate that the writer's mind ordered effort of Nature, thrown off the phenomenon are noticeable. herself in vain.

Simply to enumerate all the symptoms of behaviorism. so many are they. Yet not more than the present unattainable ideals of chameleonlike.

Marriages are not normally made to avoid having children.

Has not science the noble privilege of carrying on its controversies without personal quarrels?

Imprisoned quacks are always replaced by new ones.

Laws should be made, not against quacks but against superstition.

If popular medicine gave the people wisdom as well as knowledge, it would be the best protection for scientific and well-trained physicians.

Physicians can only be called such when the ultimate aim of their labors is the healing of disease.

But once we have recognized that disease is naught else than the course of vital processes under altered conditions, the concept of healing expands to imply the maintenance or reëstablishment of the normal condition of existence.

Even in the hands of the greatest physicians, the practice of medicine is never identified with scientific (laboratory) medicine, but is only an application of it.

When we have exact knowledge of the conditions of existence of individuals and of peoples, then only will it be possible for the laws of medicine and philosophy to gain the credence of general laws of humanity. Then will the Baconian "knowledge is power" become reality.

After serving as a medical officer in Prussian barracks, where he wrote his epoch-making tract on the Conservation of Energy (1847), Helmholtz abandoned medicine for a brilliant career in mathematical physics. He confirms, in most glowing terms, the view of Hippocrates and Aristotle that medical training, and the kind of reasoning which the physician employs in practice, will also fit the mind for work in the most abstruse branches of pure science. In the entire history of medicine and science, he is the most striking exemplar of this fact.

HELMHOLTZ

But I look back upon my medical studies as the school which taught me, in a more penetrating and convincing way than any other, the eternal principles of scientific work, principles so simple yet continually forgotten, so clear and yet ever shrouded by a deceptive veil.

Medicine was once the intellectual home in which I grew up and even the emigrant remembers and is best remembered by his native land.

To an old student like myself, the *once* familiar, somewhat matronly visage of Dame Medicine is barely recognizable, so fresh and vivacious has she become in the rejuvenating spring of natural science.

For him who has to cope with the hostile forces of reality, indifference and romance disappear; what he really knows and can do is put to severe

tests; he must see everything in the hard, clear light of factual experience and can no longer lull himself in agreeable illusions.

Individuals, as well as nations, who wish to rise to the height of manhood must learn to look reality in the face, if it is to be bent to the purpose of the mind. To flee into an ideal world is a false resource of transient success; it only facilitates the play of the adversary, and when knowledge only reflects itself, it becomes unsubstantial and empty, or resolves itself into illusions and verbiage.

The Critique of Pure Reason is a continual sermon against the use of the category of thought beyond the limits of actual experience.

Whoever desires to give his hearers a perfect conviction of the truth of his principles must, first of all, know from his own experience how conviction is acquired and how not. He must have known how to acquire conviction where no predecessor has been before him, i.e., he must have worked on the confines of human knowledge and have conquered for it new territory.

A teacher who retains convictions foreign to himself is all well enough for pupils who depend upon authority as the source of their knowledge, but not for such as require basic convictions of the utmost depth.

It was said of Claude Bernard that he was not so much a physiologist as "physiology personified" (*la physiologie même*). His *Introduction to the Study of Experimental Medicine*, recently translated by Henry Copley Greene (New York, 1927) is the breviary of laboratory workers in this field, of which Bernard himself was, in a very large and real sense, the founder. Never have the working principles of laboratory medicine been stated with such convincing precision as in these luminous sentences.

CLAUDE BERNARD

Observation is a passive science, experimentation an active science.

Cuvier expressed the same thought by saying: "The observer listens to Nature; the experimenter questions and forces her to unveil herself."

Pathology includes real experiments which are spontaneous, and not produced by physicians.

Man is naturally metaphysical and arrogant, and is capable of believing that the ideal creations of his mind, which express his feelings, are identical with reality; whence it follows that the experimental method is not naturally a primary appanage of man. It is only after long courses of error in theological and scholastic discussions that he finally acknowledges the sterility of his efforts along these pathways.

In science, the thing is to modify and change one's ideas as science advances.

The science of life is a superb and dazzlingly lighted hall which may be reached only by passing through a long and ghastly kitchen.

Our ideas are only intellectual instruments which help us to penetrate phenomena. We should drop them when they have served their turn, even as one scraps a bistoury grown rusty from long usage.

All natural philosophy is summed up in these terms: to know the laws governing phenomena. Every experimental problem reduces itself to this: to foresee and direct the course of phenomena.

Science repulses the indefinite.

Astronomers limit themselves perforce to observation, as they cannot go to the skies to experiment on the planets.

True science teaches us to doubt and to abstain from ignorance.

A scientific hypothesis is merely a scientific idea, preconceived or pre-
visioned. A theory is merely a scientific idea controlled by experiment.

At first, we feel and believe that absolute truth is ours by right, but study will soon dispel these illusions bit by bit.

Science increases our power in proportion as it lowers our pride.

If I had to define life in a word, it would be: Life is creation.

In pathology, as in physiology, the true worth of an investigator consists in pursuing not only what he seeks in an experiment, but also what he did not seek.

The names of the prime movers of science disappear gradually in a general fusion and the more a science advances, the more impersonal and detached from the past it becomes.

In the arts and literature, personality is everything, for these are spontaneous creations of the mind and have nothing to do with the statement of natural phenomena, in which the mind should not create anything. The poet maintains its value through these creations of art and letters. A modern poet has characterized the personality of art and the impersonality of science, as follows: Art is I: Science is We.

The investigator should have a robust faith and yet not believe.

Put off your imagination as you take off your overcoat, when you enter the laboratory; but put it on again, as you put on your overcoat, when you leave the laboratory.

When it is said that great thoughts come from the heart, it means that they come from the feelings, for our feelings, which have their physiological origin in the nerve-centers, act upon the heart like peripheral sensations.

A fact is nothing in itself. It avails only by the idea attaching to it or by the proof which it furnishes.

Man can learn nothing unless he proceeds from the known to the unknown.

We have in our minds an intuition or feeling as to the laws of Nature, but we do not know the form. We can learn it only by experiment.

We usually give the name of discovery to recognition of a new fact, but the idea connected with the fact is, in my opinion, what really constitutes the discovery. Facts are neither great nor small in themselves. A great discovery is a fact whose appearance in science gives rise to shining ideas, whose light dispels many obscurities and shows us new paths.

A discovery is generally an unforeseen relation not included in theory, for otherwise it would be foreseen.

It has often been said that to make discoveries, one must be ignorant . . . by which is meant that it is better to know nothing than to cherish fixed ideas based on theories whose confirmation we constantly seek, while neglecting everything that fails to agree with them.

We must never make experiments to confirm our ideas, but simply to control them.

The truly scientific spirit should make us modest and kindly. We really know very little and are all fallible in facing the immense difficulties presented by investigation of natural phenomena. United effort is better than to divide and nullify by personal disputes.

The doubter is a true man of science: he doubts only himself and his interpretations, but he believes in science.

Some physicians fear and avoid counterproof; as soon as they make observations confirming their ideas, they refuse to look for contradictory facts, for fear of seeing their hypothesis vanish.

When we begin to base our opinions upon medical fact, on inspiration or on more or less vague intuitions about things, we are outside of science and are exemplars of that fanciful method fraught with greatest dangers, in that the health and life of the patient turn upon the whims of an inspired ignoramus. True science teaches us to doubt and, in ignorance, to refrain.

The uncompromising agnosticism of the youthful Virchow was maintained with breezy, jocund vigor by Huxley, the ablest English prose-writer of his time.

HUXLEY

The man of science has learned to believe in justification; not by faith, but by verification.

Ecclesiasticism in science is only unfaithfulness to truth.

Science commits suicide when it adopts a creed.

The world is neither wise nor just, but it makes up for its folly and injustice by being damnably sentimental.

Orthodoxy is the Bourbon of the world of thought. It learns not, neither can it forget.

Science is, I believe, nothing but *trained and organized common sense*, differing from the latter only as a veteran may differ from a raw recruit.

A detective policeman discovers a burglar from the marks made by his shoe, by a mental process identical with that by which Cuvier restored the extinct animals of Montmartre from fragments of their bones.

Education is the instruction of the intellect in the laws of Nature, under which name I include not merely things and their forces, but men and their ways.

Next to being right in this world, the best of all things is to be clearly and definitely wrong, because you will come out somewhere. If you go buzzing about between right and wrong, vibrating and fluctuating, you come out nowhere.

If a little knowledge is dangerous, where is the man who has so much as to be out of danger?

Most of the faults and mistakes of the ancient philosophers are traceable to the fact that they knew no language but their own, and were often led into confusing the symbol with the thought which it embodied.

Whatever practical people may say, this world is, after all, absolutely governed by ideas, and very often by the wildest and most hypothetical ideas.

Men can intoxicate themselves with ideas as effectually as with alcohol or bang, and produce by dint of intense thinking, mental conditions hardly distinguishable from monomania.

The living voice has an influence over human action altogether independent of the intellectual worth of what it utters.

It is better for a man to go wrong in freedom than to go right in chains.

Comparable with the aphorisms of Claude Bernard on the approaches to experimental medicine are those of Charcot on the bedside approach to disease. The essence of his teaching was, in fact, the doctrine of the spontaneous approach and the danger of preconceived ideas.

CHARCOT

To learn how to treat disease, one must learn how to recognize it. The diagnosis is the best trump in the scheme of treatment.

In dealing with a nervous patient, you should regard the malady before you merely as an episode. Thus, in a case of chorea, it is only necessary to inquire how long it has existed. The condition of the patient is only an accident in the history of the disease, just as each of us is only an accident in the history of humanity.

Clinical medicine is made up of anomalies, while nosography is the description of phenomena that occur regularly. What we look for in the clinics is almost always exceptional; what we study in nosography is the rule. It is well to know that, in the practice of medicine, a nosographer is not always a clinician.

Claude Bernard said: We must not subordinate pathology to physiology but the other way around. We must first pose our problem from the actual data of clinical findings and then attempt to give a physiological explanation. To do otherwise is to lose sight of the patient and to distort our conception of the disease.

If the clinician, as observer, wishes to see things as they really are, he must make a *tabula rasa* of his mind and proceed without any preconceived notions whatever. Magendie, we are told, advised the laboratory experimenter to proceed aimlessly. I am almost prepared to recommend this method to the clinical observer.

In the last analysis, we see only what we are ready to see, what we have been taught to see. We eliminate and ignore everything that is not a part of our prejudices.

It is the mind which is really alive and sees things, yet it hardly sees anything without preliminary instruction.

Disease is from of old and nothing about it has changed. It is we who change, as we learn to recognize what was formerly imperceptible.

How is it that, one fine morning, Duchenne discovered a disease which probably existed in the time of Hippocrates?

Why do we have to go over the same set of symptoms twenty times before we understand them? Why does the first statement of a new fact always leave us cold? Because our minds have to take in something which deranges our original set of ideas, but we are all like that in this miserable world.

There is, in any well executed description of disease a remarkable power of transmission. If made at the right time, it will penetrate even the least prepared minds. What had hitherto remained in the womb of nothingness has begun to live. A description of a hitherto unknown species of disease is an event, a very great event, in pathology.

In medicine, even the most stoical intelligences have not been able to confine themselves to simple statement of fact; there is always the tendency to bring facts into relation with some theory or other. It appears to be a necessity of the human mind.

Allbutt's teaching, already set forth at length in these pages,⁷ took another line, namely that, in clinical medicine, we should never confuse the symbol (the name or fictive concept of the disease) with the real thing (the patient before us) :

ALLBUTT

In medieval times, so fastidious were logic and abstraction that practice became a vulgarity, and he was the greatest teacher who carried his pupils furthest from things.

Medicine likewise, because it deals with things, has always been for our serener circles a Cinderella, blooming maid as happily as she has grown nevertheless.

We find, in ruling classes, and in social circles which put on aristocratical fashions, that ideas, and especially scientific ideas, are held in sincere aversion and in simulated contempt.

The Greek was an individualizing and an emancipating spirit, the medieval collective and enthralling—a genius of assemblies and associations of men.

In science, law is not a rule imposed from without, but an expression of an intrinsic process. The laws of the lawgiver are impotent beside the laws of human nature, as to his disillusion many a lawgiver has discovered.

We are led to think of diseases as isolated disturbances in a healthy body, not as the phases of certain periods of bodily development.

The name of a disease is not, as it is continually regarded, a thing.

⁷ *Bull. New York Acad. Med.*, 1926, 2. s., ii., 491-501.

Diseases are not even species, such as cats and toads, but abnormal, though not altogether irregular behavior of animals and plants.

Finally, we come to a group of physicians who, like Huxley, have acquired the tolerant, ironic comprehension of the man of the world, who frequently express their views of things with the point and pungency, the sting and tang of epigram. One of the earliest of these was the great medical scholar, Karl Friedrich Heinrich Marx, whom Rohlf's (to whom Marx left his fortune) called "Marx the only":

MARX

That is the best country which has the fewest diseases, laws and crimes.
He who says more than he sees and hears, sins against nature, since he has two eyes, two ears and only one mouth.

If superstition were curable, the remedy for it would long since have been found; were it mortal, it would long since have been buried.

More than the hand is the tongue the organ which can do most good and evil.

In nature, those who cry out with pain and those who prescribe remedies therefor are different persons: in politics, they are one and the same.

If an author's books die with him, it shows them to be parasites, which survived only through him, with no independent life of their own.

In actual life, pious churchgoers may show up as deceitful tricksters and theorizing physicians as blind empirics.

Physicians see many "diseases" which have no more real existence than an image in a mirror.

Neurotics and psychotics see, hear and smell things which do not exist. Official investigators, similarly afflicted, seem to be perfectly normal.

A masked gout is easier to penetrate than a mask of virtue.

That fear induces weakness and sickness is better demonstrated by a devastating epidemic than by moral philosophy.

Medicine heals doubts as well as diseases.

The individualized physician is, in the truest sense, a man of the world.

In this genre, Osler excelled, apart from his larger utterances on medicine, familiar to all in Dr. Camac's collection:

OSLER

In all things relating to disease, credulity remains a permanent fact, uninfluenced by civilization or education.

From Hippocrates to Hunter, the treatment of disease was one long traffic in hypotheses.

across the room, shouting: *Altjungferphilosophie!—verdammtes Zeug!* One marvels, in this connection, at the current view of poetry as a "burble" and the concern of continental Europe about "medical philosophy." In the sentences herein strung together, there is enough latent medical philosophy to furnish forth a thousand volumes; but as Alfred Noyes has said, with sovereign intelligence, "there is no precision of expression like the precision of great poetry."⁸ As supreme modes of self-expression, great poetry and great music make the spirit to exult, the heart to expand and the mind to increase in power. There are poetic lines which express the fundamental ideas of science better than science itself, illustrating Sir James Barrie's dictum that "the scientific man is the only person who has anything new to say and who does not know how to say it." The poetic fragments of Empedocles contain a clear statement of the doctrine of Conservation of Energy, the essence of the humoral pathology, the popular theory of the determination of sex and even the rationale of the vegetable rennets or *présures*, which have latterly occupied the attention of French chemists:

"But as when rennet of the fig-tree juice
Curdles the white milk and will bind it fast."

The *Divina Commedia* of Dante summarizes the scientific knowledge of the Middle Ages. All that is valid in Freudian doctrine (ambivalence of emotion) is in the *odi et amo* of Catullus or the *Zwei Seelen* of Goethe. The *pectora caeca* of Virgil conveys Aristotle's doctrine of the heart as the seat of intelligence, while an English poet expresses, at once, Harvey's curious transfer of the intelligence from the heart to the blood and the basic notion in "behaviorism"—

"Her pure and eloquent blood
Spoke in her cheeks and so distinctly wrought,
That one might almost say her body thought."

Of great medical men, Claude Bernard and Charcot, Allbutt and Osler, have, in particular, something of this

⁸ In his review of the poems of the physiologist Sherrington. *Nature*, Lond., 1926, cxviii, 364.

heightened perception and luminous expression of things, the lift into the ampler aether, without which aphoristic wisdom of any kind is apt to seem a phase of *taedium vitae*.

In the practice of medicine, a single uttered word may suffice to blast a reputation or to poison the peace of a lifetime. Clinical teachers of the Frerichs or Neusser stamp, who are always proclaiming just how, where and why a patient is going to die, are very poor bedside doctors, and in no sense "healing physicians" (*Heilärzte*). What drives the people to quacks and irregular practitioners is the natural human feeling that one may get well after all, that "relief from suffering is an obtainable goal" and that "the best inspirer of Hope is the best physician." This is the *crux*, the present dilemma of socialized medicine and of laboratory medicine, or what the Germans call "guinea-pig medicine." Whether from the viewpoint of the *medico mentiri licet* or of the Hippocratic vow to silence (*Halt's Maul! Dummkopf!*), there is the wisdom of deep feeling in the monody of the Irish poet:

"The silliest charm gives more comfort to thousands in sorrow and pain,
Than they will ever get from the knowledge that proves it foolish and vain:
For we know not where we come from and we know not whither we go,
And the best of all our knowledge is how little we can know."

F. H. GARRISON.

THE WESLEY M. CARPENTER
LECTURE

THE PATHOLOGY OF THE AGING PROCESS

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In the very heyday of man's powers, in the full summer of his creative possibilities, and of his desires and ambitions, the life-drama played by each human actor discloses, quite suddenly and unexpectedly, its real tragicomic motive. It is, as if the player himself, had been enacting a part in a drama, the course and the end of which he did not fully comprehend. It had been a pleasant play of exciting incident, joyous adventure, vital desire and satisfaction, ambition and achievement. The actor has waned with his role to his own satisfaction, and now, well past the middle of the second act, he is shocked by a sharp hint from the prompter's box that his interpretation of his role must be changed into another key—one less pleasant, more difficult and unsatisfying. From now on to the end of the third act he must portray the picture of gradually flagging desire and failing powers, of disillusionment, fading pleasures and progressive fatigue, in other words, senescence, until his role ends in ultimate death. The title of this tragicomedy is "The Life of Man"; its three acts are entitled: I, Evolution; II, Maturity; III, Involution. It is the story of a living, multicellular organism—a chemicophysical machine transforming, storing and releasing energy—capable of building and restoring its own substance, and repairing its wear-and-tear damage within certain bounds, but only for a limited period of time. As is the case with all energy-producing machines, the life of the individual human machine is not immortal, but has, perforce, from the very nature of its substance and construction, the complexity and intricate

relationships of its manifold parts, and the peculiar nature of the work it has to do, a limited period of useful existence. The individual machine wears out; but before wearing out it has the power of producing out of its own substance and energy-store the materials for the creation of other machines of its own kind. Although mortal as an individual organism, it secures a potential immortality for its kind. It does this, however, at the price of its own self-destruction, for under normal conditions its duration of existence is determined by factors inherent within the machine itself.

THE NATURE OF THE HUMAN MACHINE

We look upon the animal organism as a combustion apparatus which burns and transmutes inert materials into living protoplasm with the production of heat and vital energy. The manifestations of its work constitute the vital functions of nutrition and metabolism, motility, irritability and reproduction. The essential goal of its labor is the perpetuation and evolution of the species—the preservation, transmission and modification of the germ plasm. When this is assured or accomplished, the individual machine has served its purpose. Its duration of existence is determined, therefore, by the conditions and factors necessary to accomplish racial preservation and progress. Important among these factors are the length of the period preceding puberty, the duration of the reproductive period, and the length of time required for the postnatal care of the progeny. All of these factors are inherent within the germ plasm of the race; the individual's duration of life dependent upon such intrinsic factors is the normal or biologic span of life, and its termination constitutes *normal* or *biologic death*. But this is not the only form of death that may come to the multicellular animal organism, nor is it the usual one. Unfavorable factors in the environment may check the career of the individual at any time in its course—*pathologic extrinsic death*—the most common fate of animal life; or there may be present

inherent abnormalities in the germ plasm of any given line fore-ordaining its early or premature termination—*pathologic intrinsic death (inherited)*. Very few, if any, human beings achieve a biologic span of life and a normal intrinsic death; the great majority succumb to a pathological extrinsic death, a smaller number to a pathologic intrinsic death.

PERIOD OF EVOLUTION OF THE HUMAN MACHINE

The life of the human individual created by the union of sperm and ovum consists of the relatively short intrauterine period of ten lunar months, and the much longer extrauterine period that may be extended over nine to ten

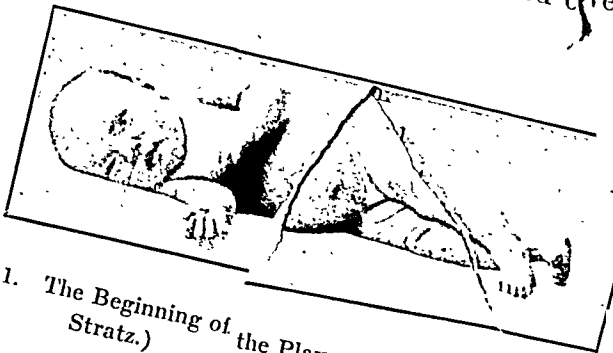


Fig. 1. The Beginning of the Play. (Infant 8 days old. After Stratz.)

decades, usually only seven or less. Both of these periods—the intrauterine as well as the extrauterine—represent a continuous progression from the beginning of the life of the individual to its end. This may be represented by a curve, the ascending portion of which is the period of growth (*evolution*), its apex a relatively short plateau of maturity, and the descending curve the period of retrogression (*involution*). The ascending curve of growth begins in intrauterine life from the moment of the first

division of the fertilized ovum, and shows two distinct periods, the embryonic and the fetal. The energy of growth of the fertilized egg is greater than that at any other period in the life of the given individual. During the second month the growth of the embryo is relatively greater than that from the period of birth to maturity; in the third month its growth equals relatively that of the first six years of extrauterine life; in the fourth month as much as in the first three years, and in the fifth month as much as in the first year after birth. This extraordinary energy of growth following fertilization consists chiefly in the production of cell-masses and their differentiation into the three germ-layers. By the end of the first month the embryo has passed through the most essential stages of its pre-human development, by the end of the second month it has attained well-defined human form, and in the third month its sex can be clearly recognized. This closes the germinal or embryonic period, and fetal growth and differentiation now proceed with a remarkable loss of growth energy. Not all organs and tissues grow at the same rate, and these differences determine bodily form and proportions.

After approximately 280 days the period of intrauterine life is completed, and with birth the individual enters upon his extrauterine period of growth and development which leads essentially to increase in height and weight. During this time also the differences in rate of growth bring about further changes in the bodily proportions. Within this period there occur also the development of the teeth, the conformation of the head and face, the ossification of the bones, and various changes in the viscera and soft tissues. The period of extrauterine evolution extends from birth to that of maturity or completed sexual ripeness. It will be seen from Figure 3 that this period shows also six well-defined subdivisions in which growth proceeds at varying rates and for different purposes of evolution: The period of the nursling's development, followed by the period of neutral infancy with its two cycles of stationary and accelerated growth, the first periods of turgor and

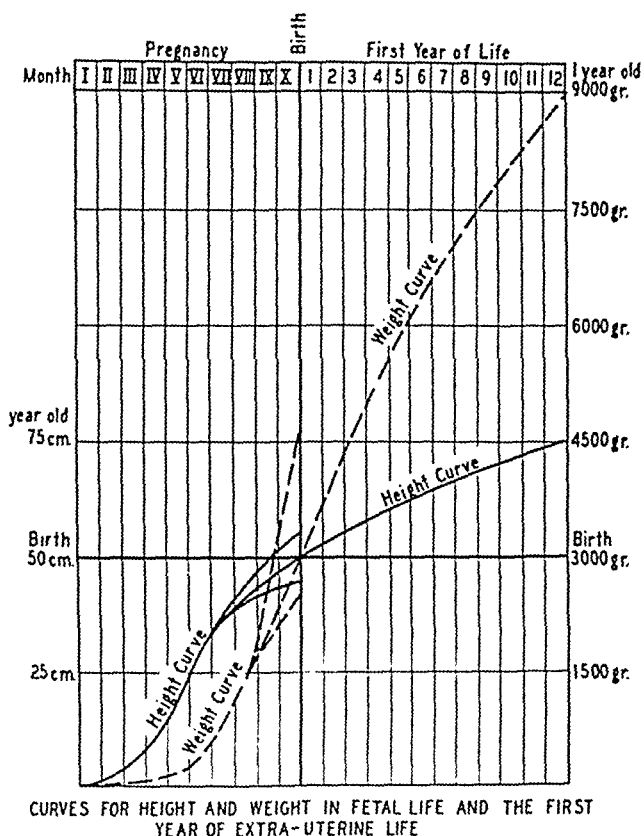


Fig. 2. (After Stratz.)

proceritas; then the bisexual period of childhood with also two distinct phases of growth, the second periods of turgor and proceritas, and finally the period of adolescence. After birth the growth-energy is strongest during the first year: height is increased about 50 per cent. and weight about 200 per cent., as shown by Figure 2. This preponderance of weight increase over height increase gives to the first year of life the greatest fullness and rotundity of body seen at any stage of life. In Figure 3 the normal height and weight curves for both sexes are shown up to the period of full development, 28 years for the male, and 24 years for the female. It will be seen that boys attain half of their total height by the end of the third year, while girls attain the same at the end of the second year. Half

of the total weight for boys is attained in the 13th year, by girls in the 11th year. It is important to note that the extrauterine expenditure of growth energy does not progress uniformly, but in wave-like movements of retardation and acceleration. This may be roughly indicated as the 2-4, 5-7; 8-10, 11-15 year-periods, constituting the first

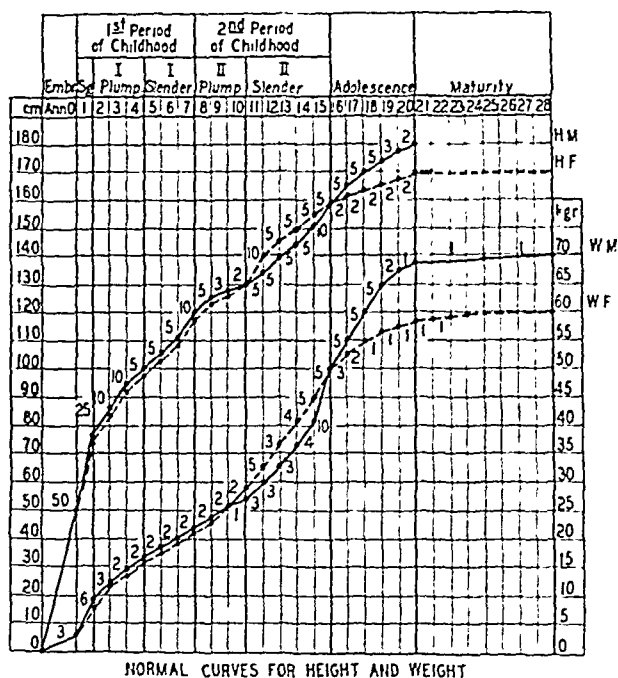


Fig. 3. (After Stratz.)

and second cycles of turgor and proceritas. From the 16-20th years the curves of growth for the boy become steeper, those for the girl gradually flatter. Both sexes become larger, fuller and more powerful. Complete maturity of growth, as evidenced by the flattening of the height-weight curves is usually attained by the male at 28 years of age, and by the female at 24 years, at these ages the *plateau of maturity or ripeness* is reached, and the vital energies of the organism are directed toward the business of *reproduction*. All of the energy-producing

1 Evolution				2 Involution			
1 Ascent				2 Peak		3 Descent	
1 Childhood		2 Youth		3 Maturity		4 Age	
1 Child		2 Boy Girl	3 Youth Maiden	4 Adult Male Adult Female		5 Old Man Old Woman	
1 Infancy		2 Boyhood Girlhood	3 Adolescence Virginity	4 Virility Maternity	5 Maturity Climacteric	6 Senescence	
1 Nursing	2 Neutral Infancy	3 Bisexual Infancy	4 Puberty	5 Full Sexual Power	6 Ripe Age	7 Retrogression	
	Turgor I	Proceritas I	Turgor II	Proceritas II			
Year 0-1	2-4	5-7	8-10	11-15	16-21	21-40	
Teethless	Milk Teeth		Permanent Teeth				41-60
1 Play Age		2 School Age		3 Work Age Sexual Age		81-100	
						Loss of Teeth	
1	II	III	IV	V	VI	VII	VIII
				IX			

THE STAGES OF LIFE

Fig. 4. (Altered and Adapted after Stratz.)

and expenditure from the fertilization of the ovum, through embryonic and fetal life, birth, and the six growth periods of extrauterine life have been apparently chiefly, or solely, for the attainment of this end, that the species shall not perish from the earth, but shall be renewed—with evolutionary modifications, we must surmise—or the whole process seems without reason.

We have taken the height-weight curves as the most striking and important indices of the period of evolution. Similar curves could be plotted for the growth of the individual organs and tissues. In each of the eight periods of growth that we recognize as constituting the whole period of evolution there are constant changes in bodily proportions taking place due to the unequal growth of the different organs and tissues. As a general rule the organs that show the greatest degree of growth in extrauterine life are those that were the least developed at birth. During the period of evolution the vital energy for growth is so strong that it exceeds that of the functional; at maturity the two are so balanced that cell destruction and cell growth are so equalized that repair is possible without loss of tissue elements. In Figure 5 the curves of functional development are shown for the different decades of life. Starting at birth the curve of nutrition and metabolism falls relatively as the body attains its development, and at the 20th year continues on a horizontal plane; the motility curve ascends proportionately to that of growth until the period of maturity, reaching its height during the third decade; the curve of reproduction remains neutral until the sharp rise at puberty and begins to fall at about 30, declining more rapidly than the functions of motility and nutrition. The curve of the cerebral and spiritual function ascends sharply, closely paralleling the curve of growth, but continues to ascend after this period is ended, beginning to fall at about the middle of the seventh decade. It is the only vital function that shows persistent evolution after the termination of the period of growth.

PERIOD OF MATURITY

With the attainment of sexual maturity the peak of life is reached somewhere in the level plateau of the curves of growth between the 30th and 50th years. These boundaries are far from being fixed; the individual variations are great, and it is no more possible to say in what year the peak is reached than to determine the exact boundary between evolution and maturity or between maturity and regression. There is too much complicated interlocking of the vital processes, and the body machine is made of other smaller machines that vary in their periods of evolution and maturity. We may say that the peak is that point at which the vital energies make use of the food taken in to run and repair the machine without adding to its substance. Nevertheless, after the attainment of reproductive maturity some growth takes place exceeding the repair of loss of substance. According to some authorities the limit of height may not be reached until the 35-40th

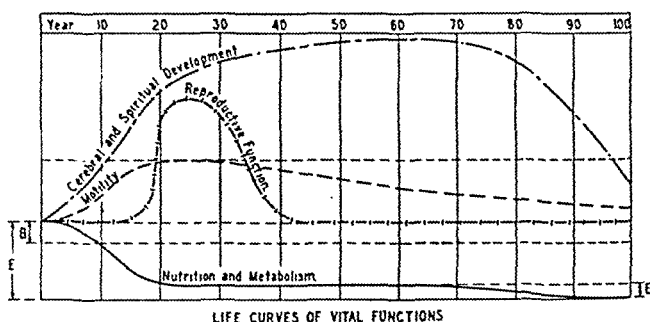


Fig. 5. (Based in part upon Stratz. Author's modification.)

year, and there is usually an increase in weight for both sexes during this period, largely due to an increase in the storage of fat and resulting from the disproportion between the fuel-intake and fuel-consumption. To what extent this increase in adipose tissue is physiological or due to the environment of modern civilization cannot be positively determined. Progressive ossification is also going on throughout this period; its significance may be that

of regression rather than of growth. Practically, therefore, maturity has been reached when an equilibrium between intake and replacement of old tissues without the formation of additional ones occurs. The period of maturity is the period of reproductive activity. Both sexes have completed their sexual developments and are now ready to carry out their greatest function, the propagation of their race; and the vital energies of this period urge them relentlessly to this consummation—the male to the activities of impregnating, protection of the female and his progeny; the female to her more strenuous sexual functions of ovulation and menstruation, pregnancy, birth, lactation, and the maternal care of the offspring. The age of sexual activity is also the creative and productive age, particularly for the male. The success of his life, his career in business or profession, his fullest mental and spiritual development, his happiness are more closely related to and dependent upon his management of his reproductive period than upon any other period of his life. If measured by fertility the high point of life falls somewhere between the 25th and the 37th years. The simple production of progeny, however, cannot be taken as the index to the highest point of life efficiency and achievement, because of the long postnatal period of care necessary for the preservation and evolution of human progeny. It is, therefore, more reasonable to assume that normally the peak of life extends into the fifth decade. (See figure 4.)

PERIOD OF INVOLUTION

When the object of the reproductive period has been achieved—when progeny has been secured and its independent existence secured, the mature carrier of germ plasm is no longer necessary in the scheme of evolution. Having fulfilled his biological duty, he must pass from the scene, and his withdrawal is brought about gradually and slowly through the involution of his energy-machine and the weakening of his vital functions. He must pass now through the regressive periods of senescence and old age until the final release is obtained through death. We are

now confronted with the mystery and problem of protoplasmic involution. But is it any stranger than that of protoplasmic evolution and progressive growth? Indeed, in the economy of the human energy-machine the two processes have been coexistent from the time of the fertilization of the ovum and the beginning of its cell-division. Throughout the whole period of development, both intra- and extrauterine, the regression or involution of temporary structures and organs has taken place; these served their purpose of usefulness for a certain time and disappeared during the ascent of the organism to its maturity. We need only mention the gill-slits, the placenta, umbilical cord, the ductus arteriosus, the umbilical vessels, the urachus, the milk teeth and the thymus among the various structures that undergo involution after the completion of their temporary functions. Especially remarkable is the life-history of the placenta. At the birth of the organism it is a senile structure repeating in detail much of the pathologic tissue-changes that later are to appear in the aging process of the mature organism: The sclerosis of arteries, fibrosis of stroma, atrophy and degeneration of the chorionic epithelium, necrosis of villi, thrombosis and calcification, all of this pathology of old age appears in this important vascular organ at the completion of intra-uterine life. In the fulfillment of its function the placenta passes through well-defined stages of evolution, maturity and senescence and when its work is over it is discarded as useless and disappears from the scene of the individual life. Prophetic of the future fate of the organism as a whole!

The human mind accepts these localized organ- and tissue-involutions as reasonable and normal processes in the evolution of the human body; they excite no apprehension, no fears, no regrets; to the average uneducated individual they are wholly unknown. Quite different is the case with respect to the signs and manifestations of that major involution involving the organism as a whole. We regard the appearance of senescent signs as a tragic joke played upon us, which we resent more or less with

bitterness. We may attempt to blind ourselves to the fact that the peak of life has been passed and that the downhill march has begun, and that from that first moment of recognition the descent is progressive and inevitable to the moment of final extinction. But we cannot; and the severest test of human character is at hand, whether we shall accept the situation with equanimity or in sorrow vainly regretting.

Just when the tide begins to turn in any given individual from the high-water mark of maturity down hill cannot be determined with accuracy. The individual variations are great, five to twenty years in apparently normal individuals. It becomes very difficult, therefore, to differentiate a normal first climacteric from a premature or a deferred one. The transition from the stage of growth-equilibrium to that of regression shows no sharp line of demarcation. Age comes at first with a slow and insidious approach, unheralded and unperceived, until all at once the unwelcome guest is established with us. The functions of the various organs and tissues do not begin to diminish uniformly; there is an interlocking of mature function and retrogression, just as there is in the case of incompletely evolved and mature function on the ascending curve of life. Senescence is, therefore, a gradually developing complex or syndrome of organ and tissue involutions. When these become sufficiently advanced as to become clinically apparent, then we say: "Age is upon us." The *aging process* consists, therefore, of a combination of organ- and tissue-involutions, shown histologically by well-defined tissue-lesions and manifested clinically by descending function-curves. While these individual tissue and organ involutions begin at different times, and are to some extent independent of each other, each single line of involution once well initiated, may through the weakening or loss of the given function, initiate or strengthen retrogressive changes in other organs. The various lines of involution are not wholly independent, but in the general economy aid and supplement one another until various

vicious circles and correlations of retrogression are produced. *Senescence* is the gradual development of these lines of retrogression—the resulting complex is *Old Age*. Beginning very gradually and insidiously in the fifth and sixth decades of life for the two sexes respectively, the *Age-Complex* rises rapidly above the clinical horizon in the seventh decade, and in the average individual is usually well-developed in the period from 65 to 70 years. By this time the energy-charge of the organism has fallen so low that senility is usually established in all organs and tissues and manifests itself in a change in all functions. There are, of course, great individual variations in this descent of the energy curve, not only as regards the involution of the organism as a whole but as regards individual tissues. Too-great variations are not common as physiologic phenomena and must be regarded as having a pathological significance.

FUNCTIONAL CHANGES DURING SENESCENCE

In Figure 5 the life curves of the four chief vital functions of sensibility, motility, reproduction and nutrition are given for a life of 100 years. These vital functions develop closely together and supplement one another, but show very different values at different periods of their evolution. The curve of nutrition rate drops from birth, being most active in the first and second decades, is maintained thence at a level until about sixty, when the curve descends progressively until the end. The central nervous system functional curve rises continuously from birth until about the seventieth year when it begins a rapid descent. The curve of motility rises during the first two decades of life, reaches a plateau for a decade or more, and falls gradually from about the thirty-fifth year. The curve for the reproductive function is stationary from birth until about the middle of the second decade, rising steeply to reach its apex in the third, and falling to a neutral level in the fifth decade. Each decade of life has, therefore, its corresponding functional activity, and prepares for the vital processes of the succeeding ones.

In Figure 6 the comparative physiology of the stages of growth, maturity and involution are shown for the most important organs and tissues:

Height. Full height is usually not attained until about the 35th-40th year, although the increase after the 20th year is relatively small. After the 65th year there is a gradual decrease in height, more marked after the 75th year, in all about 1.5 cm.

Weight. Very difficult is the determination of average normal weight curves. The individual variations are very great, and the influences of environment, personal habits, sexual activity, reduction in vital energy, etc., produce still greater variations. While many people attain their greatest weight at 25-30, others reach it only in the fourth decade. As the reproductive function declines the majority of both sexes show an increase in adipose tissue, and this increase may persist, or the weight be maintained at this level until the latter part of the seventh decade. How much of the climacteric tendency to obesity is physiologic, how much of it pathologic, due to disproportion between intake and combustion, remains to be determined. In a certain degree the obesity of this period must be regarded as one of the signs of senescence, associated with the decline of the reproductive function (spermatogenesis) and general activity. After the 70th year there is a very definite loss of 2.5 kg., due to the loss of the water-content and other changes in the connective tissues.

Skeleton. Processes of ossification may go on in the body even up to the 60th year, but the normal extent is usually reached by the 30th year. Through the loss of water content the old bones become firmer, and this process continues progressively during the period of involution. After 50 years the long bones and the larger flat ones gradually become osteoporotic, with larger marrow spaces and corresponding increased fragility. They may retain, however, their normal conformation. The spinal column becomes shorter and more sharply curved; the intervertebral disks become contracted and thinner. With

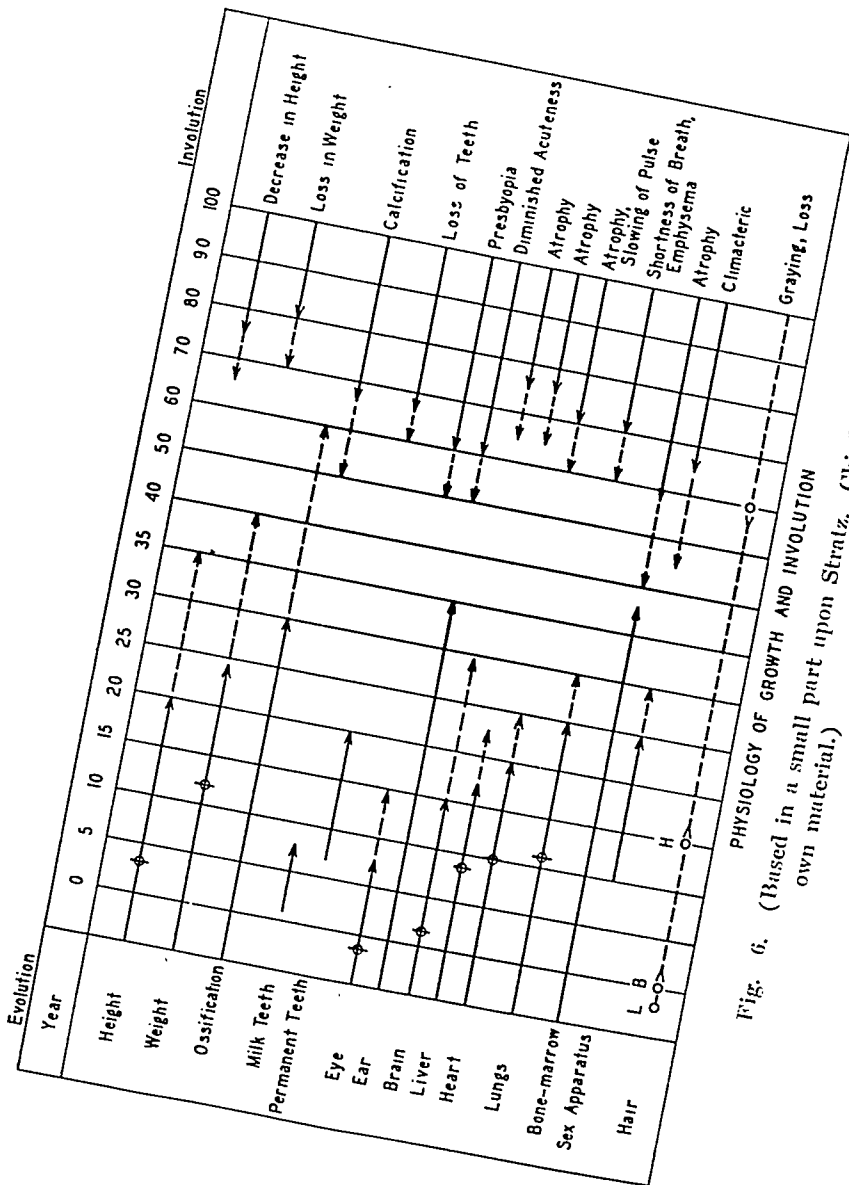


Fig. 6. PHYSIOLOGY OF GROWTH AND INVOLUTION
(Based in a small part upon Stratz. Chiefly author's
own material.)

loss of the teeth atrophy of the alveolar processes occurs, and there is developed the characteristic senile facies which cannot wholly be concealed by artificial teeth. In the skull the sutures become indistinct or may wholly disappear.

Calcification. Coincident with the beginnings of osteoporosis deposits of lime-salts begin to appear in sclerotic blood vessels, cartilages and elsewhere. This is always to be regarded as a retrogressive condition, secondary to some previous degenerative change. The demarcation between the purely physiologic involution change and pathological processes of calcification is very difficult of determination, and we possess no criterion but that of degree.

Teeth. The teeth are usually fully developed by the 25th year, in exceptional cases by the 30th, and under physiologic conditions should persist until about the 65th year. Under modern conditions scarcely an individual of 50 years is in full possession of sound teeth, and the majority may be lost by 60 years.

Eyesight. From the time of birth the field of accommodation is progressively narrowed, from 14 diopters in the nursing, to 12 diopters at 15 years, 10 diopters at 20 years, 7 at 30 years, 4 at 40 years, 2 at 50 years, and under 1 at 60 years. These changes constitute perhaps the best index of physiologic age recognizable clinically. This narrowing of the visual function leads gradually to presbyopia between 45-50, increasing much after 50 years. In many individuals the advent of far-sightedness is the first recognizable sign of senescence and the recourse to eye-glasses marks the period. There is a very close relationship between its appearance and the beginning of the decline of the reproductive function.

Hearing. A decided loss in acuteness of hearing begins usually at about 65 years, and may increase progressively to the end of life. In the very old the degree of deafness is usually marked.

Intellectual and Spiritual Life. While there are great individual variations, these functions of the central nervous system usually are preserved in physiologic old age and may increase in value until about the 65th year when some impairment of memory and mental reaction may begin to show; after 70 the retrogression of cerebral function proceeds rapidly, so that in those who reach or pass the 80th year a characteristic picture of "second childhood" develops. Here again we are confronted with the very great difficulty of distinguishing between physiologic involution and pathologic conditions because of the great range of individual variation.

Digestive Function. A lowering of this function begins shortly after the 60th year, and is shown chiefly in a lessened appetite, "heavy" and unpleasant digestion, gas-production and constipation. These evidences of lowered function in the alimentary tract increase progressively to the end of life. An inadequacy of pancreatic function is frequently shown in the so-called "benign glycosuria" of the aged. The bilirubin content of the blood serum is usually increased in old age.

Circulation. The pulse rate falls from 120 at birth to 70-80 at maturity, and after the 60th year to 60 per minute. In the majority of individuals there is usually an increase in tension from the 50th year on to about the 70th when many old people show a decided lowering. More or less marked irregularity is common after the 65th year. Particularly with respect to this function are the boundaries between physiologic involution and pathologic conditions very poorly defined, and the individual variations are very large.

Respiration. The respiratory rate sinks from 28 in the newborn to 18 per minute at maturity and to 16 or lower in the old man. Expiration is prolonged. Shortness of breath, in severe degrees asthmatic in character, constitutes one of the unpleasant symptoms of old age.

Bone-marrow and Lymphoid Tissues. Blood-cell formation is reduced; the senile individual presents a certain degree of secondary anemia. Although immune to a large number of the infectious diseases through which he has passed in the course of his life the senile individual loses resistance to the respiratory infections, the pyogenic cocci and to mould infections of the skin and to thrush. Various forms of *linca pruritus* are very common in the aged, and erysipelas increases in incidence during this period.

Urinary Function. Disturbances of this function are very common after the 60th year. Polyuria, nycturia, polakiuria, retention, incontinence, cystic glandular hyperplasia of the prostate leading to stasis, cystitis, calculus, etc., are among the most unpleasant and almost universal symptoms of the senile period. We are even at a greater handicap here in differentiating normal involutions and pathological processes, and the individual equation plays a very large role as to the extent and degree of the urinary disturbances of old age.

Hair. Graying of the hair is regarded as a physiologic involutionary change and usually has appeared by the 60th year. Coincident with this is the appearance of the coarse "senile bristles" in the nose, ears and eyebrows. The body hair becomes more abundant and also coarser. It is still a mooted question whether baldness is a physiologic involution, or an inherited pathologic condition, or a pathologic condition resulting from the habits and conditions of life. Some individuals achieve the extreme limits of age without becoming bald; the majority, however, show varying degrees of baldness after maturity has been passed, the daily loss of hair exceeding the new growth. Changes in the elasticity of the skin usually accompany those of the body and head hair. "Wrinkles," roughness, discoloration and a tendency to hyperkeratosis gradually develop after the 55th year; but here again the individual variations are so great and the influence of the environment so potent that no positive statements can be made as to the time and degree of the skin changes due

to age. The same thing may be said as to the sinking of the female breast as an index of age; it occurs in some women even shortly after puberty. All soft parts of the body undergo a very appreciable shrinking after the age of 70 due to the loss of water content.

Reproductive Function. Inasmuch as this is the chief function of the individual life and from the biological point of view the one logical reason for the ascent and maturity of the animal energy machine, it is but logical to conclude that when the carrier of the immortal germ plasm has arrived at maturity and continued at that stage sufficiently long enough to have secured its survival in his progeny, he, himself, is now in the way of evolution. Biologically useless he now becomes, and he disappears by a gradual fading-away process from the active stage of life. The old saying, expressed less vulgarly than in the original form, that "When the reproductive capacity has ceased, then the man is as good as dead!", is based upon an absolute foundation-fact. All of the evolutionary process of life prepares the animal organism for the performance of this function, and as soon as it has been accomplished the tide of involution begins to turn. If we judge the course of this function by its results in progeny—that is, by the fertility of the human race—we see that its peak is reached in the third decade of life. There are so many other factors determining the production of children during this period, that fertility and reproductive capacity do not necessarily produce parallel curves; and it is much more probable that the peak of the curve of the functional capacity for reproduction falls rather in the latter part of the 4th decade or about the beginning of the 5th. There takes place then a very rapid decline in reproductive capacity for both sexes, earlier and more rapidly in the female, so that by 45-50 she usually loses the function of reproductive power. The same climacteric for the male is usually placed about ten years later, at 55-60. We do not know, however, the approximate time when spermatogenesis in the human male ceases. It has been generally assumed that active spermatogenesis in man persists

usually until about the 63rd year, and in some men until a much later time. There are, of course, in the literature numerous tales of very old men becoming fathers. It is possible that the individual variations as to spermatogenic function are as great as these stories would indicate, but it is also doubtful that many of those tales of senile fatherhood are true. Few male bodies over 55 years of age come to the autopsy table with evidence of active or normal spermatogenesis in their testes. While it is possible that in many of these cases of aspermatogenesis this condition is the result of the disease causing the death of the individual, the same condition is also found in the testes of healthy individuals at the same age dying of accident. The writer is inclined to believe that for the majority of men active sperm-formation ceases in the 6th decade. The absence of sperm in the semen has apparently no relationship to the persistence of sexual desire and potency for sexual intercourse; as these features of the reproductive function may persist, and even increase in intensity long after all sperm-cells have disappeared from the semen. After spermatogenesis has ceased it would appear that the continuation of virility constitutes a certain social function in holding parents together until the children's future is assured. Experience has taught the writer that many men over 50 years of age, priding themselves on the preservation of their virility, but unable to achieve children in marriage with younger women, show on microscopic examination total absence of spermatozoa in the seminal discharges, and without a history of previous venereal disease. This is not a question that has received any adequate investigative study; such is badly needed to throw additional light on the senescent period. From what knowledge we possess we can say reasonably that the peak of life coincides with the peak of the reproductive capacity (spermatogenesis), and the downhill retrogression of senescence runs a fairly close parallel with the decline of the spermatic function. It should be emphasized in this connection that this view of senescence has

nothing in common with the interstitial-cell theory. Coincident with the retrogression of the sperm-cell production go other evidences of a progressive loss of energy. Chronic and progressive fatigue, lack of aggressiveness,



Fig. 7. The Climax of the Play. Man of 63 years, just at the beginning of senescence. (After Stratz.)

disillusionment, mental and spiritual depression and a gradual lowering of all activities mark this decline in varying degrees. If we sum up all of the functional evidences of involution, and group them as to their order of

appearance and importance it is interesting to note that the first signs of age noted by the average male at this period are: Presbyopia, sexual neurasthenia, and chronic fatigue. This triad of symptoms may be taken as marking the advent of senescence. (See Figure 7.)

THE PICTURE OF FULLY DEVELOPED SENILITY

By the 65th-70th year the processes of involution have usually become so evident that the fully developed picture of Old Age is presented. The main features of this picture may be summed up briefly, as follows: A stooping or bent posture, reduction in height, increased bony prominences, stiffness of joints, loss of stretching power, a shuffling gait, uncertain movements, appearance of general weakness, loss of coördination, tremors, general emaciation, flabby panniculus, dependent breasts, hang-belly, flabby and soft musculature, hernias, prolapse, flabby and shrunken genitalia, frequent hydrocele, loss of teeth and atrophy of alveolar processes, barrel-shaped thorax with widening of the epigastric angle, obliterated interspaces; the skin inelastic, wrinkled, rough, showing patchy pigmentations and hyperkeratoses; there is graying and loss of the head hair, while senile bristles occur in the eyebrows, nostrils and ears; the body hair is usually increased, coarser, and gray or white; vision is dim and uncertain, the conjunctiva are reddened and watery, the cornea dull, the limbus opaque; hearing is dulled; the voice husky or cracked, speech slowed and uncertain, the mouth is dry, the tongue coated and fissured, and there is a slight husky cough; respiration is slowed, and shallow, with prolonged expiration; the peripheral arteries are tortuous and hard; the pulse slow, irregular and frequently increased tension; there is a tendency to varicose veins and hemorrhoids; the metabolic rate is lowered; the secretions of all organs diminished; digestion is slow and difficult; excessive gas production, eructations and constipation occur in varying degrees; benign glycosuria is not uncommon; bladder control is lost to some extent, retention, pollakiuria, nycturia,

and incontinence are frequent symptoms; the bodily temperature is frequently subnormal, and the senile individual complains of cold and is easily chilled; the sensory nerve-endings, tactile, sexual, etc., are dulled; and finally the involution processes in the central nervous system show themselves in loss of memory, slowness of mental



Fig. 8.

Fig. 8. Well developed senility in woman of 70 years (after Stratz).

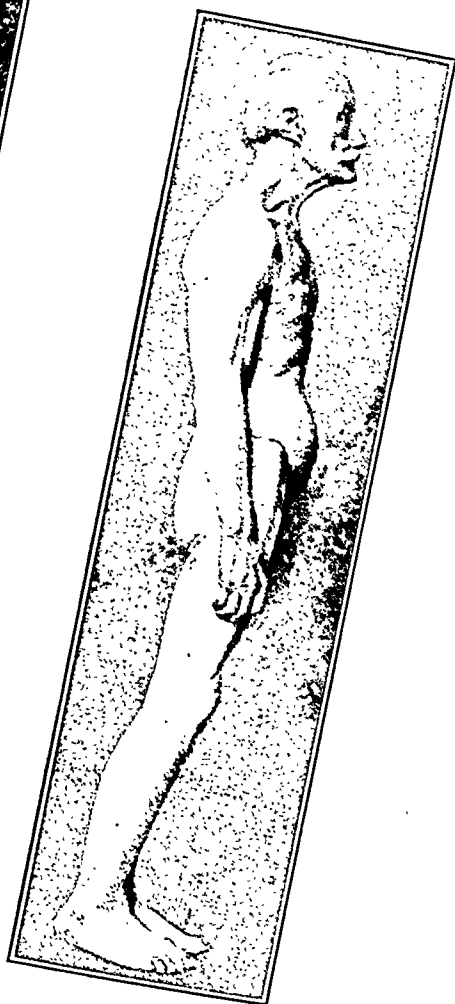


Fig. 9.

Fig. 9. Well developed senility in man of 76 years (after Stratz).

reactions, asphasias, psychical fatigue, and weakness, irritability, changes in personal habits, daytime sleeping and nocturnal insomnia, "second childhood" and dementia. This picture of fully developed senility is well illustrated in Figures 8 and 9, the old man of 76 and the woman of 70 years of age. In Figure 10 the contrast between an old father of 80 years and his son of 37 years emphasizes the differences existing between the period of full maturity and that of advanced senility. The weary, worn-out machine of the old man contrasted with the insolent aggressiveness of the son in the height of his maturity tells the story of the meaning of involution and old age more effectively than any detailed scientific description can do. Only in Solomon's figurative description of old age in the last chapter of Ecclesiastes is there to be found in any of the world's literature an adequate word-picture of the closing days of human life: "In the day when the keepers of the house shall tremble, and the strong men shall bow themselves, and the grinders cease because they are few, and those that look out of the windows be darkened,

And the doors shall be shut in the streets, when the sound of the grinding is low, and he shall rise up at the voice of the bird, and all of the daughters of music shall be brought low;

Also when they shall be afraid of that which is high, and fears shall be in the way, and the almond tree shall flourish, and the grasshopper shall be a burden, and desire shall fail: because man goeth to his long home, and the mourners go about the streets."

TERMINATION OF THE INVOLUTION PROCESS IN INTRINSIC DEATH

When the involution of the organism has reached such a degree of functional lowering that any one of the vital functions cannot carry on, then biologic death takes place, and the career of the individual human organism is closed. As we said early in this paper such a biologic or normal death is rarely achieved by man—he usually succumbs to

individuals will attain it because of the varying environment and the individual varying intrinsic reactions to the environment. The average equation resulting between these two factors brings about a life limit shorter by 15-25 years than the theoretic biologic limit of 100 years. This fact has tended to fix in the popular mind the Psalmist's *three score and ten* as the ideal term of human life. But only a small per cent. of human beings born alive can hope to attain even this. Out of every one hundred human beings born alive only about 4-8 per cent. pass the 60th year. Twenty per cent. die in the first year of life; by the age of 20 years 40 per cent. have died; and only 2-4 per cent. attain the age of 80. (See Figure 11.) The lowered resistance of the body during the period of senescence, and the pathologic conditions secondary to and dependent upon the tissue-lesions of involution are the causes respon-

Of every 100 human beings born	According to Hufeland (1800)	According to Silbergleit (1900)
Living to the 10 th year	50	65
" " " 20 "	30	60
" " " 30 "	20	58
" " " 40 "	14	55
" " " 50 "	9	40
" " " 60 "	6	12
" " " 70 "	4	8
" " " 80 "	2	4

Fig. 11. Expectancy of the duration of life in different decades in 1800 and 1900, according to Hufeland and Silbergleit.

sible for the rapid increase of deaths after the peak of maturity has passed. Modern sanitary and hygienic science has, however, increased markedly the number of senescent survivors. According to Hufeland, in 1800, only 9 individuals out of 100 reached the age of 50; according to Silbergleit, in 1900, there were 40 out of every hundred

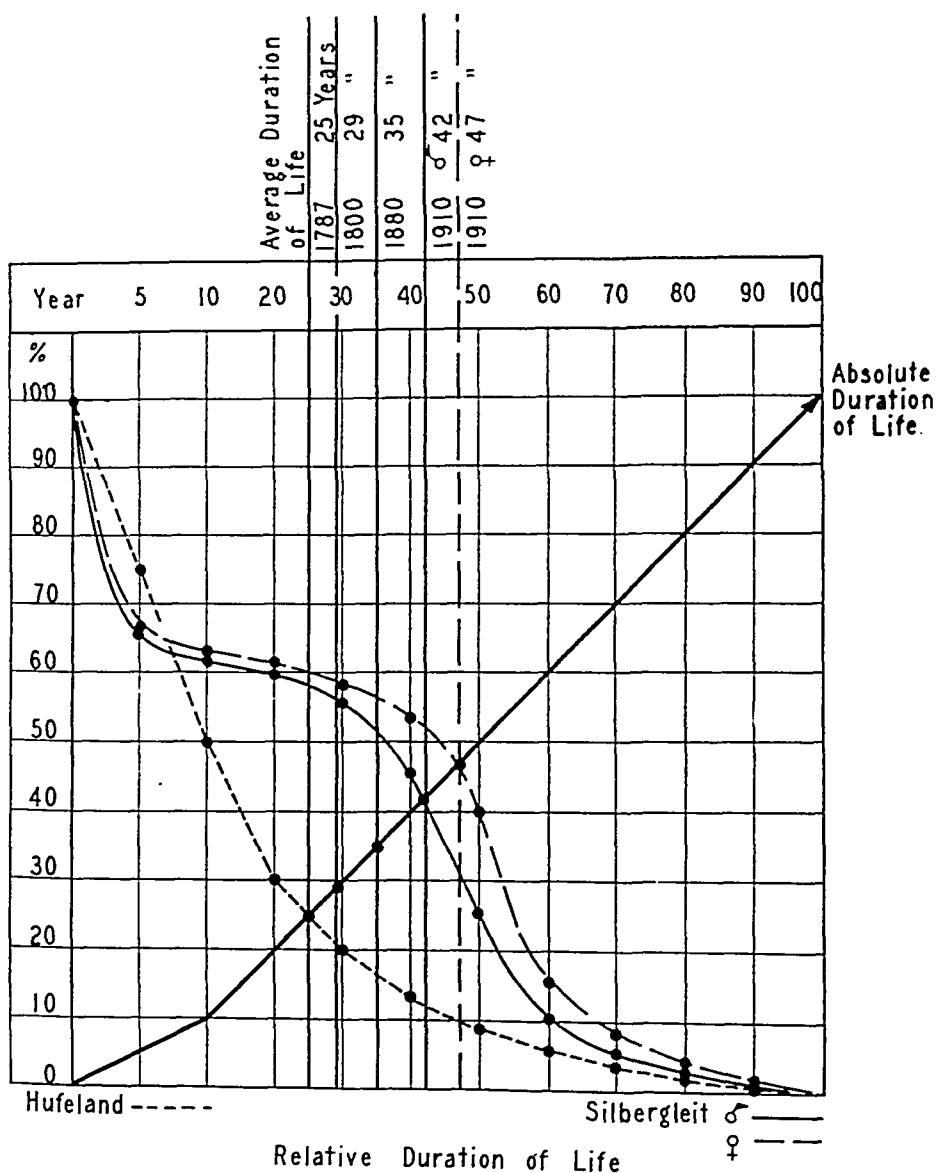


Fig. 12. Relative duration of life, according to Silbergleit.

Senile Survivors, Both Sexes in America According to Census Reports of 1880, 1890, 1900, 1910, and 1920 (Census Report, 1920, Vol II page 154.)

	1880	1890	1900	1910	1920
80-84	146,362	203,851	251,512	321,754	402,779
85-89	49,835	75,240	88,600	122,818	156,539
90-94	16,100	23,645	23,992	33,473	39,980
95-99	4,763	5,648	6,266	7,391	9,579
100 and over	4,016	3,981	3,504	3,555	4,267

Fig. 13. Based on U. S. Census Reports.

Total Survivors at Ages 80-89 and 90-100 According to Census Reports

Age Decades	1880	1890	1900	1910	1920
80-89	196,197	279,091	340,119	444,572	559,318
90-100+	24,879	33,274	33,762	44,419	53,826

Ratio of Survivors at Ages 80-89 and 90-100+ to Total Population for Same Periods

	1880	1890	1900	1910	1920
80-89	.0039	.0044	.0045	.0048	.0053
90-100+	.0005-	.0005+	.0004+	.0005+	.0005+

Fig. 14. Ratio of senile survivors in decade 90-100 remained unchanged from 1880-1920, showing that modern life has not increased the biologic span of life.

who attained this age (figures for the population of North Germany. (See Figure 12.) This represents a conquest of modern life over the environment; and means a greater expectancy of life at birth, and an average longer duration of life. The intrinsic inherited biologic duration of life, however, remains the same, and cannot be affected by these changed conditions, except possibly in a long evolutionary period. In Figure 13, the senile survivors for the half decades from 80 to 100 years, are given for the last five United States Census Reports, and in Figure 14 the relative proportion to the total population is given for the ages 80-89 and 90-100 for the same periods. From this chart it will be seen that while the 1920 census shows an increase of senile survivors in the 80-89 decade over that of 1880, there is practically no increase in the ratio of survivors in the 90-100 decade during the same period of time. This is in harmony with our view. Improved modern life increases the number of senescent survivors up to the 80-89 decade, but does not increase the number of senile survivors after the age of 90. Modern conditions, as expected, have not extended the individual biologic life limit, and cannot do so.

PRIMARY INVOLUTION TISSUE CHANGES

The tissue changes of the involutionary process are identically the same for the period of senescence as for the involution processes of temporary structures during intrauterine life and in the extrauterine period of evolution. The changes in the senescent placenta may be taken as an example of their nature. There is a progressive thickening and contraction of the chorionic stroma; from a loose semimyomatous tissue it becomes increasingly fibroid, its stroma cells fewer in number, and the intercellular substance more hyaline in character; the blood-vessels show thickened and more hyaline walls, and the lumina gradually become narrowed. The cell-layer of Langhans of the chorionic ectoderm disappears by the middle or end of the third month of pregnancy; the syncytium undergoes a

gradual loss in proliferative power, syncytial buds become fewer, and on the older and more fibroid portions of the chorion localized necrosis of the syncytium takes place, preceded by marked nuclear pyknosis and vacuolation. Intervillous thrombi are formed on the dead and degenerating syncytium, deposits of lime salts take place when the vascular sclerosis and obliteration reaches a certain stage. A slow anemic infarction of a cotyledon or portion of such may take place—the physiologic anemic infarct of the placenta. Without going further into detail of the changes in the various organ and tissue involutions, we may say that essentially they present identical tissue lesions, and that these are the same in the involutionary processes of old age. These involutionary tissue-changes are:—

1. Loss of power of division. Fewer mitoses. Fewer regenerative proliferations. Numerical atrophy.
2. Quantitative atrophy. Parenchymatous cells fewer in number and smaller in size. Reduction in cytoplasm and in nucleus. Condensation of chromatin, pyknosis, eventually vacuolation and karyolysis. Frequent appearances of lipoid droplets in cell cytoplasm; in many cells, lipoid pigments appear.
3. Shrinking and condensation of intercellular substance, most frequently a hyaline fibrosis; loss of water, changes in colloid state; in the panniculi the fat cells are replaced by a mucin-containing stroma resembling that seen in myxedema.

4. Vascular changes. These are characteristic of the involutionary process at all periods, and must be inherent within the vessels themselves, inasmuch as wear-and-tear forces can hardly explain the sclerotic changes occurring in the ductus arteriosus, the umbilical vessels, involuting thymus, and later in the ovary after the first follicle has ripened and discharged. In all periods of involution the vascular changes are histologically identical with those occurring during senescence. Without going into a detailed description of the well-known features of the arte-

riosclerosis of age, the essential features of which are an atherofibrosis of the vessel wall, with or without proliferative changes, ultimate loss of elastic tissue and muscle cells, occlusive or with dilatation of lumen, and incidental lime-salt deposits. Aside from the processes of thrombosis, embolism, aneurismal dilatation, rupture, etc., which may be secondary to the vascular changes, the resulting disturbances of circulation in the parts supplied by such sclerotic vessels are extremely important in the secondary pathology of senescence. The main features of the gross pathology of the viscera of the senescent body are: 1 Atrophy. Reduction in size except in the case of the emphysematous lung and the hyperplastic prostate; 2, Increase in consistency, due to the relative increase in stroma; 3, Changes in color, browner or grayer; 4, Increased translucency; 5, Serous atrophy of adipose tissue. Throughout the entire body, there is an increased toughness of the connective tissue membranes and fascias. Special senile features of the autopsy are the increased adherence of the dura mater, the erosion of the inner table of the skull, the Pacchionian erosions and perforations, the thickened and more opaque meninges, the more sharply pointed cerebral convolutions, the thickened and frequently cystic chorioid plexus, the discoloration and calcification of the cartilages, osteoporosis of bones, pulmonary emphysema, low diaphragm, barrel thorax, droplet heart, ptoses of gastro-intestinal organs, the generalized atrophy and passive congestion. The atrophy of the viscera shows most markedly in the spleen, liver, testes, heart, lungs and pancreas, differing in this order from the atrophy of starvation. The adrenals always show an excessive degree of lipoidosis. The atrophic testes are browner in color from the lipid pigment increase in the interstitial cells.

Before leaving the subject of the primary pathology of age, the changes in the testis deserve additional attention. So much has been said about the potential immortality of the germ plasma that many people assume that its existence in the sex-glands, at least in the testis, continues until the end of the life of the individual. We have made

it clear above that the germinal epithelium of the sper-
 matic tubules undergoes retrogression very early in se-
 nescence, and that its atrophy is practically coincident
 with the advent of senescence. In the very old individual
 the testis may be fibroid, or nearly so, the tubules being
 represented by the hyaline basement membranes of the old
 tubules. If any tubules still persist the epithelium is re-
 duced to a single layer of low vacuolated cells, or the epi-
 thelium may be gone entirely. As this atrophy of the sper-
 matogenic tissues develops in the early part of senescence
 the so-called interstitial cells (puberty gland) become
 larger and more prominent, brownish in color and filled
 with lipoid droplets. In many cases they form such strik-
 ing masses of cells scattered among the atrophic tubules
 that an increased number seems possible. This promi-
 nence of these cells may persist, and apparently does so,
 until the end of life. Such changes are wholly in contra-
 diction to any theory of a rejuvenating internal secretion
 ascribed to these cells. On the other hand these cell
 changes support the view that their function is a metabolic,
 nutritional one, concerned in the process of spermatogen-
 esis, and when this process comes to an end, these cells
 become over-burdened with a lipoid pigment similar to the
 disuse lipoid pigmentations occurring in other atrophic
 tissues.

SECONDARY PATHOLOGY OF SENILITY

The secondary pathologic conditions that are made pos-
 sible and favored by the primary involution process are
 many and of great clinical importance, because it is usu-
 ally through some one of these that the senile individual
 is kept from achieving a biologic death. They include
 nearly all of the causes of deaths occurring at the period
 of life. They fall into several well-defined groups:—

1. *Secondary to the Vascular Changes.* Thrombosis,
 embolism, infarction, atrophy, apoplexy, cerebral soften-
 ing, paralysis, psychical degeneration, etc., due to cerebral
 arteriosclerosis; coronary sclerosis, thrombosis, myocar-
 dial infarction, angina pectoris, cardiac insufficiency, etc.;

renal arteriosclerosis, contracted kidney, nephrosis, chronic nephritis, etc.; peripheral sclerosis leading to gangrene. Sclerosis of aorta, aortalgia, angina.

2. *Secondary to the General Atrophy.* Reduced functions of all organs including endocrinal. General lowering of resistance. Increased susceptibility to respiratory infections, bronchitis, broncho-pneumonia, erysipelas, etc. Functional inadequacies, glycosuria, etc.

3. *Stasis Conditions.* Infections of urinary and genital tract. Cystitis, prostatitis, pyelitis. Infection of biliary and pancreatic tracts. Stasis catarrhs of alimentary tract, constipation, etc. Formation of calculi in any of the body passages (biliary, urinary, salivary, etc.).

The most important of these pathologic conditions of old age secondary to the primary lesions of old age are shown in Figure 15.

CONCENTRATION OF DISEASE IN CERTAIN AGE PERIODS

Another striking relationship between disease and the time of life is shown in Figure 16 which represents the predominance of certain diseases in different age-periods; rachitis in the first five years, rheumatic fever in childhood, tuberculosis in the late childhood and adolescent period, venereal diseases at puberty and early adult life with the carrying on of syphilis through middle life producing many varied pathologic conditions then, neoplasms other than carcinoma in the early part of adult life, carcinoma in the senescent period, likewise in this period various metabolic conditions associated with the progressive loss of energy, cardiovascular diseases in senility, and two periods for diseases of the nervous system, that of early sexual life and that of early senescence. Numerous factors concerned with environment, stage of development, social, emotional, etc., are concerned in this concentration of diseases in certain periods of life, and cannot be discussed here. The association of carcinoma with the senescent period is so striking that cancer is regarded by many

SECONDARY PATHOLOGICAL CONDITIONS ASSOCIATED WITH THE AGING PROCESS

Central Nervous System	{Cerebral arteriosclerosis.]
	{Thrombosis. Embolism. Infarction. Hemorrhage. Atrophy. Sclerosis.
	{Loss of memory. Loss of self-control. Perversion.
	{Senile dementia. Senile psychoses. Vertigo.
	{Senile epilepsy. Senile chorea. Apoplexy.
	{Hemiplegia. Paraplegia. Aphasias. Apraxia.
	{Brown-Sequard's Syndrome. Presbyophrenia.
	{Hysteria. Autosuggestion. Insomnia.
	{Melancholia. Exaggerated ego. Hallucinations.
Eye	{Loss of Accommodation Power. Arcus Senilis. Senile Cataract.
Ear	{Atrophy of Nerve. Sclerosis. Progressive Deafness.
Thyroid	{Atrophy. Reduced metabolism. Skin changes.
Heart	{Myocardial Degeneration. Cardiac Inadequacy. Coronary Thrombosis. Infarction.
	{Cardiac Thrombosis. Angina. Numerous Functional Disturbances.
Aorta	{Aortalgia. Angina. High or Low Pressure. Thrombosis. Embolism.
Lungs	{Chronic Bronchitis. Bronchopneumonia.
Arteries	{Thrombosis. Embolism. Infarction. Gangrene. Atrophy.
	{Diminished Blood Supply.
Kidneys	{Arteriosclerotic Atrophy. Pyelonephritis. Stasis-Kidney. Pollakiuria.
	{Nycturia.
Bladder	{Stasis. Cystitis. Calculus.
Prostate	{Cystic Glandular Hyperplasia. Stasis. Secondary Infection.
Liver	{Atrophy. Reduced Function.
Gall-bladder	{Stasis. Calculi.
Pancreas	{Atrophy. Lowered Function.
Gastrointestinal Tract	{Atrophic Catarrh. Stasis. Disturbances of Digestion.
Lymphoid Structures and Bone Marrow	{Lowered Resistance, Anemia.
Bones	{Osteoporosis. Fragility. Fatty Embolism. Deficient Healing.

Fig. 15. The chief secondary pathologic conditions associated with the aging process.

as a disease of senescence. It, however, does not occur in all old people, as does arteriosclerosis; it is not a primary involution process, and not a biologic retrogression; it, therefore, is not an essential feature of old age, but is

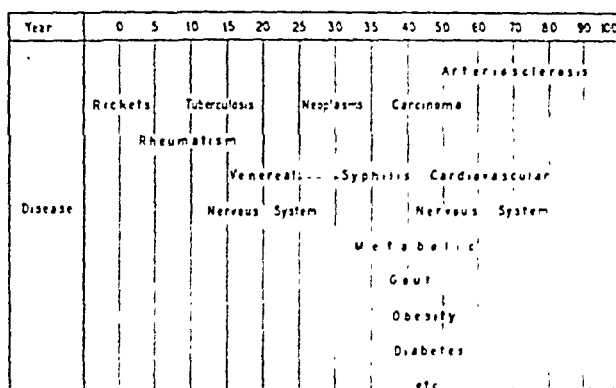


Fig. 16. Concentration of pathologic conditions in various age-periods.

dependent upon an inherited pathologic anomaly of constitution, that like gout and other metabolic anomalies asserts its development coincidentally with senescence.

THEORIES OF SENESCENCE

Curiously enough many medical men of the last century, lacking the wisdom of David and Solomon in recognizing that the life of a man has a definite normal limit, have regarded the aging process as a progressive disease; according to Brown-Sequard caused by the sclerotic changes in the vessels, according to Metschnikoff by intestinal putrefaction, according to Victor Horsley due to degeneration of the thyroid gland, while Lorand and numerous followers of his believe that it is caused by the degeneration of all the ductless glands, particularly the thyroid, adrenals and gonads. The modern scientifically-trained biologist, however, cannot look upon senescence and old age as disease processes but regards them as a physiologic entity, the result of involution processes inherent in the organism. The exact mechanism of this involution is, of course, the



Fig. 17. The End of the Play. (Man of 98 years of age, in complete second childhood, with multiple malignant senile hyperkeratoses over face and body. Author's observation.)

the loss of the tail of the sperm cell, the very act of fertilization, are prophetic of future involutionary processes in the life of the organism. 'The senescent process is potent, therefore, from the very beginning, and grows in volume and extent in proportion to just one thing—the fulfillment of function. None of the theories of senescence detailed above is applicable to these earlier and localized *senescences*; if they cannot be fitted to the explanation of these, they cannot be applied to the explanation of the *major senescence*. It is evident then that *involution* is a biologic entity equally important with *evolution* in the broad scheme of the immortal procession of life. Its processes are as *physiologic* as those of growth. It is, therefore, inherent in the cell itself, an *intrinsic, inherent, inherited* quality of the germ plasm, and no slur or stigma of *pathologic* should be cast upon this process. What its exact chemico-physical mechanism is will be known only when we know the nature of the *energy-charge* and the *energy-release* of the cell. We may say that *senescence is due primarily to the gradually weakening energy-charge set in action by the moment of fertilization. The immortality of the germ plasm is dependent upon the renewal of this energy-charge from generation to generation.*

CONCLUSION

What philosophy then may we draw from this! Is old age inevitable? Yes, escape from it is possible only for those who meet a premature pathologic death. For those who live to their biologic limit age cannot be escaped. *Nor can it be deferred. Nor is rejuvenescence possible.* The deferring of old age, the rejuvenating of the senescent individual is but idle and foolish talk, and we have had much of this in the last decade. What modern medicine has accomplished along the lines of hygiene and the prevention of disease has been only to increase the number of human individuals, both the fit and the unfit—unfortunately too many of the latter kind—who come to maturity and to the period of senescence. More individuals will achieve their biologic life limit; and this means what—ulti-

mately a much greater increase in the number of senile, more or less useless, human beings in the age decades of the eighties and the nineties. There will be some increase in the number who will reach the age of one hundred years or even pass it, due to their own family inheritance, but this number will not be greatly increased in the present period of evolution. But what advantage is gained by increasing the number of human dependents in the period of second childhood! Does this thought never occur to the enthusiastic propagandists for the extension of life! I have never seen it mentioned in the literature of such propaganda. There may be individuals who wish to live to the very limit of their biologic allotment, to pass the last decade or two of their descent to the grave in uselessness, non-productive existence, dependency, in personal discomfort, and a burden to others—I personally am not of that sort. Rather the limit set by the Psalmist—"The days of our years are three-score years and ten; and if by reason of strength they be four-score years, yet is their strength, labor and sorrow; for it is soon cut off, and we fly away." (Psalm 90, tenth verse.) The compensations of the seventh and eighth decades are many because of the longer preservation of the spiritual and mental function over that of the other functions. In a life well-ordered and well-spent, of varied physical and mental activities, the break in cerebral function comes in the average case somewhat around the 70th year, and the rapid down-hill descent is usually not apparent until after the seventy-fifth. To this, of course, there are wide individual variations. But with mental powers still preserved this period from sixty-five to seventy-five may be one of satisfaction, even of productiveness. There is an old folk-word, "The first joys of life are those of the belly, the last ones those of the mind, but the fool knows none but those of the belly." Happy then is the senescent who can approach his inevitable end with normal cerebral rate of involution, still capable of intellectual pleasures, and the mature contemplation thereof, and meet a speedy release before the unhappy days of second childhood are upon him.

THIRTY-FIRST ANNUAL MEETING OF THE
MEDICAL LIBRARY ASSOCIATION¹

PRESIDENT'S ADDRESS

ARCHIBALD MALLOCH, M.D., M.R.C.P. (Lond.),

Librarian of The New York Academy of Medicine

In the first place I wish to thank you heartily for electing me your President. It has been a great pleasure to have been quite closely in touch with the work of the Association for a year, although I have not taken a large part in it. You will soon hear from the various reports that we have had a successful year, but we must push on and help to make our own libraries and those of others as useful and as stimulating as possible to those whom we serve.

It is disappointing that we were not able to go to Montreal to see the Bibliotheca Osleriana and to have our Honorary President, Dr. Shepherd, the lifelong friend of William Osler, at our meetings. The library is ready for packing at Oxford now and practically all of the catalogue raisonné is set up in page proof. It will not be long before we shall pay our postponed visit to Montreal, where we are assured of a warm welcome. Our loss caused by the delay will mean gain to the world of medical bibliography, biography, and history through the careful and scholarly work of Dr. W. W. Francis, Mr. R. H. Hill, and Mr. R. R. Trotman, the last two of the Bodleian Library staff. We have just had the sad news of Lady Osler's death. She had hoped, I know, to see all her husband's wishes fully carried out and to see her son's books which are in the Tudor and Stuart Club at Johns Hopkins University.

The items on the programme arranged for this meeting by the Committee under the able chairmanship of Miss Trask should, and we hope will, provoke interesting and beneficial discussions. We trust that there will be ample time for members to talk over their problems with one

¹ The New York Academy of Medicine, 5-7 September, 1928.

another for, I suppose, meetings of librarians are very like those of doctors, one of their chief values being, it seems to me, the opportunity they afford of meeting confrères who are faced with the same or similar difficulties. We of the staff of this Library shall be glad to answer any questions about the methods which we have thought best to follow here where we have a large body of readers among medical men and among the general public.

We thought it a good plan to continue the Harvey Exhibition which was opened early in May especially, as he is to be the subject of the evening address by Dr. Packard. Also, we should like to emphasize the educational value of historical or bibliographical exhibitions, those showing the growth of knowledge of certain diseases in their various aspects, their etiology, distribution, diagnosis or treatment, or exhibitions illustrating the development of measures instituted for the health of the public. Not one of our libraries should feel itself unable to arrange such exhibitions. You may think that your show cases do not receive due appreciation; but take courage in the thought that if even all your best efforts have been the means of turning but one student or one young doctor towards books and towards the history of his subject you have had your reward. A good plan, it seems to me, would be for us all to hold exhibitions illustrating the lives of our local medical heroes showing their portraits and medical notebooks, their old class tickets and diplomas, and the books, medical or non-medical, which they wrote or which they owned. For instance, there is in the museum at Hamilton, Ontario, the old pine door from the house of Dr. Case with three hollows at different levels worn by the knuckles of several generations. What could reveal better than this door the position the trusted doctor held in his community? As another example of local exhibitions we could not improve upon what has been done at the Library of the Medical Chirurgical Faculty of Maryland.

To one who has given up his vocation to take up his avocation as his profession, to one who was, so to speak,

outside libraries looking in but is now inside looking out, one aspect of our work seems to call for emphasis. That is, how are we to bring more undergraduates and doctors into our libraries and make them more serious students? Some of you may reply that they come in large numbers already and I am glad if that has been your experience, but I am inclined to think that it is our duty to try and induce more to take advantage of the books and medical magazines which are provided for them.

The medical man should use books as his tools but obviously he should not be a slave to them. It has been quoted again and again, but I cannot think the matter could be better put in a nutshell than by a saying of William Osler, who, by the way, was such a source of strength to our Association. Turn again to his address, "Books and Men" (*Boston M. & S. J.*, cxliv, 1901, 60-61) in *Aequanimitus, and Other Addresses*. I must repeat the passage now: "To study the phenomena of disease without books is to sail an uncharted sea, while to study books without patients is never to go to sea at all." Have this ever in your mind and on your lips in carrying out your campaign.

There is an idea current amongst a considerable number of doctors that one who reads a great deal cannot be a practical man! It is probable they have in mind one particular man who never "went to sea at all" in whose make-up there was something which prevented him from ever being successful in the practice of medicine. Our greatest medical men have known the value of books and of libraries when the volumes on their own shelves were not sufficient for their needs. In reading about William Harvey and in perusing his notes for his anatomical lectures and his other writings I have been struck with the large number of authors, ancient and contemporary, quoted by him whose ideas he had made part and parcel of his own. It is true that he was first and foremost a great discoverer in physiology, but he was also a field biologist and a practising physician and obstetrician. We have the word of one of his contemporaries, Dr. Percival

Willoughby, telling us how much he owed to Harvey's "directions and methods" and truly he has been rightly called the "father of modern midwifery." Surely, then, Harvey was a practical man. Our Honorary President, Dr. F. J. Shepherd, is an eminently practical anatomist, surgeon, and dermatologist, but he is also a great lover of books and paintings.

For some more than for others there is the danger of taking the written word for the whole, when it is only a part, neglecting what can be learnt from observation and experience of everyday practice. Some years ago in reading *The New Republic* I made note of a passage which is to the point: "... books are only the telescopes through which we see distant facts: and we no more become *bookish* by such use than you become *optical* when you look through your telescope." All medical men need all the aid they can find to fit together the pieces of "the great jig-saw puzzle of knowledge" (Sir Francis Darwin in *Rustic Sounds and Other Studies*). Doubtless all of you can point to leading doctors in your community who are recognized for their ability and keenness at the bedside and at the same time are your most consistent readers of medical works and of the periodical literature.

How, then, are we to obtain more readers? And, in the first place, let us not forget that the task we have set ourselves is not a light one. It is probably true that the real student is born not made, that is, he is what he is rather by nature than by nurture. Can we in any way assist at a rebirth? The genuine student has, to a marked degree, the virtue of curiosity. You may remember that the amateurs of science in Italy, England, and elsewhere in the seventeenth century were called the "*curiosi*" as well as the "*virtuosi*." The former is an especially good term and would that it could be aptly applied to all medical students.

Should the student come from a home where recourse to books for information is an everyday occurrence or

where a love of good literature has been fostered and encouraged from his earliest days the teacher has only to direct and guide his pupil along new paths for the method is known already. We do not meet the student at the beginning of his medical course and the teacher is the logical person to send him to the library where once in our hands we can help him in so many ways. In many medical schools, however,—I am glad to hear their number is decreasing—the teaching staff do not take their medical library seriously enough simply because they do not know its worth, or they take it as a matter of course for they do not frequent it often enough themselves. I knew a medical student who throughout his undergraduate years was asked only once or twice by his teachers to verify a point in the library. What golden opportunities were thus lost! It is impossible to reform such hardened sinners as these teachers.

How, then, are we to set about our task? At some medical schools, notably McGill, the librarian shows groups of students, I think in their more senior years, how to look up things in the library, tells them what the catalogue is, and instructs them how to use the *Catalogue of the Surgeon General's Library* and the *Index Medicus*. This is a good plan but individual instruction is far better if the teacher has sent him with a definite question or preferably if the student comes to the library with an inquiry of his own.

If we cannot catch the student himself or are very unlikely to catch many, let us lay hold of the young instructors in medicine, surgery, and the various other branches of medicine, men who are at the bread-and-butter stage of practice who are themselves in the throes of preparing a paper for a medical society. Try to induce these men—and almost all of them will see the wisdom of your suggestion—to send their students to your library. I am convinced we can do much in this way. Tell these young teachers that you will welcome their pupils and show them the facilities of your library you will be able to provide.

It might be a good plan gently to remind the teachers by writing to them or by placing a notice on the notice board: "Do not forget to send your pupils to the library with definite questions; we are willing and able to help them. They cannot come too early in their course."

The teacher who directs his students to the library does wonders for them. William Osler was perhaps the chief exponent of this method and these excursions amongst books were of incalculable value to the young man who later on had to prepare a paper himself. With many of his students at Baltimore and Oxford an almost daily habit, lasting throughout the years, was thus inculcated. Read Sir William Osler's paper, "The Medical Clinic: a Retrospect and a Forecast" in the *British Medical Journal*, 1914, i, 10-16, and commend to your young instructors the questions asked of the students in "Table II" of the article. I know, too, from personal experience in teaching, how interested the students were when I attempted to follow this one of the Osler methods. I can remember asking students to look up and report to us at the next meeting of the small group on "lanugo," "Argyll-Robertson and his pupil," "Luska," "Harrison and his groove," "the significance of telangiectases," "the discovery of percussion," "Laennec," "pulsation in veins," "hypochondriac," "myoidema," "Babinski," and many other things. May I say with pride to ourselves as librarians that each student returned with an excellent answer for he had been properly guided in the library?

I shall not tell you how to instruct the student when he comes into your hands for you probably know more about the *Catalogue of the Surgeon General's Library*, the *Index Medicus*, and general textbooks than I. May I, however, give two or three parting words of advice? Do not encourage the student in his idea, which is so prevalent, that only the latest editions or the latest books are of use. There are important things, for instance, to be found in Klebs' *Pathology* which are not to be found elsewhere. And tell him that "not to know what happened

before thou wast born is forever to remain a child" or, as Hippocrates put it, "the physician must know what his predecessors have known, if he does not wish to deceive both himself and others."

AFTERNOON LECTURES

THE NEW YORK ACADEMY OF MEDICINE

announces a third series of practical lectures to be held on

FRIDAY AFTERNOONS

at four-thirty o'clock

The profession generally is invited to attend

1928

Nov. 2—The serum treatment and its evaluation in lobar pneumonia

JESSE G. M. BULLOWA,

Assisting Visiting Physician, Harlem Hospital

Nov. 2—Carcinoma of the larynx

JOHN EDMUND MACKENTY,

Senior Surgeon, Manhattan Eye, Ear and Throat Hospital

Nov. 16—The common affections of the colon: their origin and their management

JOHN LEONARD KANTOR,

Attending Gastroenterologist, Montefiore Hospital

Nov. 23—Clinical types of hypotension

ALFRED FRIEDLANDER,

Professor of Medicine, University of Cincinnati

Dec. 7—Certain medical complications of pregnancy and their treatment

WILLIAM W. HERRICK,

Visiting Physician, Presbyterian Hospital

Dec. 14—Management of spastic constipation and mucous colopathy in vagotonic persons

LEWELLYS F. BARKER,

Visiting Physician, Johns Hopkins Hospital, Baltimore

Dec. 21—The antitoxin treatment of erysipelas. (Lantern demonstrations)

KONRAD E. BIRKHAUG,

Associate Professor of Bacteriology, University of Rochester

1929

Jan. 4—The allergic diseases as encountered by the general practitioner

WILLIAM W. DUKE,

Visiting Physician, Christian Church Hospital, Kansas City

Jan. 11—Observations on pain in medical and surgical conditions

EMANUEL LIEBMAN,

Consulting Physician, Mount Sinai Hospital

Jan. 18—Rheumatic fever

HOMER FORBYCE SWIFT,

Rockefeller Institute

Jan. 25—Carcinoma of the colon and rectum

DANIEL F. JONES,

Associate in Surgery, Harvard Medical School

Feb. 1—Diarrhoea and dehydration in young infants

OSCAR MENDERSON SCHLOSS,

Professor Diseases of Children, Cornell University

Feb. 8—Diseases of the prostate

HUGH HAMPTON YOUNG,

Visiting Urologist, Johns Hopkins Hospital

Feb. 15—Control of conception—present and future

ROBERT LATON DICKINSON,

Senior Gynecologist and Obstetrician, Brooklyn Hospital

Mar. 1—Medico-legal questions of interest to the general practitioner

CHARLES NORRIS,

Director of Laboratories and Chief Medical Examiner of New York City

Mar. 8—Epidemic encephalitis

FREDERICK TILNEY,

Visiting Neurologist, Neurological Institute

Mar. 15—Burns and their treatment

FREDERICK W. BANCROFT,

Director Department of Surgery, Fifth Avenue Hospital

Mar. 22—Abscess of the lung

HARRY WESSLER,

Associate Physician, Mount Sinai Hospital

Apr. 5—The medical examination

HARLOW BROOKS,

Visiting Physician, City Hospital

Apr. 12—Psychoanalysis and the general practitioner

LOUIS CASAMAJOR,

Professor Neurology, Columbia University

RECENT ACCESSIONS TO THE LIBRARY

- Adam, H. A. Ueber Geisteskrankheit in alter und neuer Zeit.
Regensburg, Rath, 1928. 158 p.
- Arrom, D. Tratado de patología y clínica circulatoria.
Barcelona, Libreria Sintet, 1927. 719 p.
- Assmann, H. Die klinische Röntgendiagnostik der inneren Erkrankungen.
4... Aufl. Leip., Vogel, 1928, v. 1.
- Babcock, W. W. A text-book of surgery for students and physicians.
Phil., Saunders, 1928. 1367 p.
- Bagby, E. The psychology of personality.
N. Y., Holt, [1928]. 236 p.
- Barcroft, J. The respiratory function of the blood. Pt. 2, Haemoglobin.
[2. ed.] Cambridge, Univ. Pr., 1928. 200 p.
- Barretti, G. A new dictionary of the Italian and English languages...
[11. ed.] Lond., Pitman, 1928. 2 v.
- Barker, J. E. Cancer; the surgeon and the researcher.
Lond., Murray, 1928. 483 p.
- Barwell, H. Diseases of the larynx.
3. ed. Lond., Milford, 1928. 278 p.
- Bateson, (Mrs.) B. William Bateson, F. R. S., naturalist.
Cambridge, Univ. Pr., 1928. 473 p.
- Béclère, C. L'exploration radiologique en gynécologie.
Paris, Masson, 1928. 173 p.
- Besredka, A. Etudes sur l'immunité dans les maladies infectieuses.
Paris, Masson, 1928. 414 p.
- Bogardus, E. S. Immigration and race attitudes.
Boston, Heath, 1928. 268 p.
- Bourque, N. O. The thyroid gland and its diseases.
[Chic., 1927]. 250 p.
- Boyd, M. F. Preventive medicine.
Phil., Saunders, 1928. 475 p.
- Boyle, M. E. In search of our ancestors.
Boston, Little, 1928. 286 p.
- Bram, I. Goiter prevention and thyroid protection.
Phil., Davis, 1928. 327 p.
- Breitner, B. Die Erkrankungen der Schilddrüse.
Wien, Springer, 1928. 308 p.
- Briffault, R. The mothers.
N. Y., Macmillan, 1927. 3 v.
- Briggs, I. C. How to start in general practice.
Lond., Murray, [1928]. 158 p.
- Brockbank, E. M. & Ramsbottom, A. The clinical examination of diseases
of the lungs.
2. ed. Lond., Lewis, 1928. 112 p.
- Brücke, E. T. Ernest Brücke.
Wien, Springer, 1928. 195 p.

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- Camis, M. La fisiologia dell'apparato vestibolare.
Bologna, Zanichelli, 1928. 358 p.
- Cathcart, C. W. & Hartley, J. N. J. Requisites and methods in surgery.
Edin., Oliver, 1928. 476 p.
- Cochrane, R. G. Leprosy in Europe, the Middle and Near East and Africa.
London, World dominion press, 1928. 73 p.
- Cooper, L. F., Barber, E. M. & Mitchell, H. S. Nutrition in health and disease for nurses.
Phil., Lippincott, [1928]. 574 p.
- Cramer, W. Fever, heat regulation, climate, and the thyroid-adrenal apparatus.
London, Longmans, 1928. 153 p.
- Craveri, C. Dizionario di sinonimi e composti chimici con relative formole e pesi molecolari e le terminologie.
Milano, Hoepli, 1928. 316 p.
- Cuboni, E. La cura della paralisi generale progressiva con la malaria.
Bologna, Cappelli, 1928. 255 p.
- Davis, H. Birth control. The fallacies of Dr. M. Stopes.
London, Oates, [1928]. 80 p.
- Dearden, H. Medicine & duty.
London, Heinemann, [1928]. 234 p.
- Doflein, F. Lehrbuch der Protozoenkunde. 5. Aufl. Teil 1. Allgemeine Naturgeschichte der Protozoen.
Jena, Fischer, 1927. 436 p.
- von Domarus, A. Grundriss der inneren Medizin.
3. Aufl. Berlin, Springer, 1928. 664 p.
- Driver, J. E. & Trease, G. E. The chemistry of crude drugs.
London, Longmans, 1928. 159 p.
- Eggleston, C. Essentials of prescription writing.
4. ed. Phil., Saunders, 1928. 153 p.
- Fawcett, M. G. & Turner, E. M. Josephine Butler. Her work and principles.
London, Ass'n. moral & soc. hyg., 1927. 164 p.
- Fifield, L. R. The pathology, diagnosis & treatment of neoplasms originating in the walls of the urinary bladder.
London, Lewis, 1928. 94 p.
- Filterable viruses. By H. L. Amoss...[et al]. Ed. by T. M. Rivers.
Balt.; Williams, 1928. 428 p.
- Fletcher, J. M. The problem of stuttering.
N. Y., Longmans, 1928. 362 p.
- Forlanini, C. Scritti di Carlo Forlanini.
Bologna, Cappelli, 1928. 2 v.
- Fraenkel, L. Soziale Geburtshilfe und Gynäkologie.
Berlin, Urban, 1928. 146 p.
- Franklin, B. Autobiography of.
New ed. Boston, Houghton, 1928. 248 p.

- Freystadt, B. Kehlkopf und Rachen in ihren Beziehungen zu den Erkrankungen des Zentralnervensystems.
Berlin, Karger, 1928. 325 p.
- Gaultier, R. Précis de coprologie clinique.
3. éd. Paris, Baillière, 1927. 567 p.
- Gill, C. A. The genesis of epidemics, and the natural history of disease.
Lond., Baillière, 1928. 550 p.
- di Guglielmo, G. Sindromi neuro-ipofisarie.
Milano, S. A. Ist edit. scientifico, 1928. 311 p.
- Guttmann, W. Medizinische Terminologie... 21-22. Aufl.
Berlin, Urban, 1927. 1252 col.
- Haeberlin, C. Aerztliche Seelenkunde.
Leip., Barth, 1928. 181 p.
- Häberlin, C. Klimatische Kuren im Winter.
Leip., Thieme, 1928. 134 p.
- Handbuch der Kolloidwissenschaft... Hrsg. von Dr. W. Ostwald.
Dresden, Steinkopff, 1921-8. 3 v.
- Heindl, R. Der Berufsverbrecher.
3. Aufl. Berlin, Heise. 560 p.
- Hilger, W. Die Suggestion.
Jena, Fischer, 1928. 146 p.
- Hilliard, C. M. A textbook of bacteriology and its applications.
Boston, Ginn, [1928]. 329 p.
- Hochsinger, C. Gesundheitspflege des Kindes im Elternhause.
6. Aufl. Leip., Deuticke, 1928. 288 p.
- Hungarian med. postgrad. com. Official guide book of med. postgrad. work in Hungary.
2. ed....Budapest, Athenaeum, [1928]. 122 p.
- Jagic, N. & Spengler, G. Klinik und Therapie der Blutkrankheiten.
Berlin, Urban, 1928. 311 p.
- John, H. J. Diabetic manual for patients.
St. Louis, Mosby, 1928. 202 p.
- Joyeux, C. Précis de médecine coloniale.
Paris, Masson, 1927. 931 p.
- Kelly, H. A., & Burrage, W. L. Dictionary of American medical biography.
N. Y., Appleton, 1928. 1364 p.
- Knopf, S. A. Various aspects of birth control.
New York, 1928. 92 p.
- Köhler, A. Grenzen des Normalen und Anfänge des Pathologischen im Röntgenbilde.
5. Aufl. Leip., Thieme, 1928. 582 p.
- König, E. Der körpereigene freie Fascienverpflanzung.
Berlin, Urban, 1928. 302 p.
- Korschelt, E. & Stock, H. Geheilte Knochenbrüche.
Berlin, Borntraeger, 1928. 176 p.
- Kowarschik, J. Die Diathermie.
6. Aufl. Wien, Springer, 1928. 246 p.

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- Wehrli, I. Das öffentliche Medizinalwesen der Stadt Baden im Aargau von der Gründung des Spitals, 1349-1798.
Aarau, Sauerländer, [1928?] 123 p.
White, W. P. The modern calorimeter.
N. Y., Chem. cat. co., 1928. 194 p.
Wickham, H. The misbehaviorists.
N. Y., MacVeagh, 1928. 294 p.
Wilde, P. The pyretic treatment of rheumatism and allied disorders.
[Lond.], Southern libraries, 1928. 98 p.
Wolff, F. Aus dem Leben eines Heilstättenarztes.
München, Gmelin, [1927]. 141 p.
Zangmeister, W. Lehrbuch der Geburtshilfe.
Leip., Hirzel, 1927. 834 p.
-

DATES OF ACADEMY MEETINGS

1st and 3rd Thursdays.

STATED MEETINGS

SECTION MEETINGS

- Dermatology and Syphilis, 1st Tuesday.
Surgery, 1st Friday.
Neurology and Psychiatry, 2nd Tuesday.
Pediatrics, 2nd Thursday.
Otology, 2nd Friday.
Ophthalmology, 3rd Monday.
Medicine, 3rd Tuesday.
Genito-Urinary Surgery, 3rd Wednesday.
Orthopedic Surgery, 3rd Friday.
Obstetrics and Gynecology, 4th Tuesday.
Laryngology and Rhinology, 4th Wednesday.
Historical and Cultural Medicine, 4th Friday of October, December, February and April.

TRUSTEES, COUNCIL AND COMMITTEE MEETINGS

- Trustees, 4th Wednesday.
Council, 4th Wednesday.
Committee on Admission, 1st Wednesday.
Committee on Library, 2nd Tuesday.
Public Health Relations Committee, Mondays.
Committee on Medical Education, 2nd Thursday.
Committee on International Medical Relations, 3rd Wednesday.

DEATHS OF FELLOWS OF THE ACADEMY

JOSEPH HENRY BYRNE, M.D., 167 West 76th Street, New York City; graduated in medicine from the College of Physicians and Surgeons, New York City in 1885; he was a Fellow of the American Medical Association, a Fellow of the American College of Physicians, a member of the Society of Alumni of St. Vincent's Hospital and Visiting Physician at St. Elizabeth Hospital. Dr. Byrne was elected a Fellow of the Academy February 8, 1900; he died September 22, 1928.

PAUL BRICE FITZGERALD, M.D., Professional Building, New Rochelle, New York; graduated in medicine from Syracuse University, Syracuse, New York, 1909; elected a Fellow of the Academy March 3, 1927; died September 2, 1928. Dr. FitzGerald was a Fellow of the American Medical Association, a member of the Alumni Association of the Knickerbocker Hospital, and Attending Surgeon at the New Rochelle Hospital.

CLEMENT JACOB HALPERIN, M.D., 611 High Street, Newark, New Jersey; graduated in medicine from the University and Bellevue Medical College; and was Clinical Professor of Dermatology and Syphilology in the same school. Dr. Halperin was elected a Fellow of the Academy March 3, 1927; he died September 30, 1928.

HOMER ERASTUS SMITH, M.D., 45 Park Avenue, New York City; graduated in medicine from the College of Physicians and Surgeons, New York City in 1878. He was elected a Fellow of the Academy February 5, 1920; he was also a Fellow of the American Medical Association, a Fellow of the American College of Surgeons and Assistant Surgeon at the Manhattan Eye, Ear and Throat Hospital. He died on October 4, 1928.

ALFRED KAHN, M.D., 48 East 49th Street, New York City; graduated in medicine from the University of Virginia in 1904. He was elected a Fellow of the Academy January 3, 1918, and he was also a Fellow of the American Medical Association. Dr. Kahn died October 8, 1928.

FREDERICK JOSEPH KAMMERER, M.D., Berne, Switzerland; graduated in medicine from the University of Freiburg, Freiburg, Germany, in 1880; elected a Fellow of the Academy March 6, 1890. Dr. Kammerer was a Fellow of the American College of Surgeons, the American Surgical Society, the International Surgical Society, the American Medical Association and Consulting Surgeon at Lenox Hill and St. Francis Hospitals; he died September 26, 1928, in Merano, Italy.

MEFFORD RUNYON, M.D., 516 Prospect Street, South Orange, New Jersey; graduated in medicine from the College of Physicians and Surgeons, New York City, in 1887; he was elected a Fellow of the Academy December 2, 1897. Dr. Runyon was former Chief of the Medical Staff of the South Orange Memorial Hospital. He died September 20, 1928.

BULLETIN OF THE NEW YORK ACADEMY OF MEDICINE

VOL. IV

NOVEMBER, 1928

No. 11

ANNUAL GRADUATE FORTNIGHT

The Problem of Aging and of Old Age

INTRODUCTORY REMARKS¹

SAMUEL W. LAMBERT, President

On behalf of Trustees and Officers of the Academy, I take pleasure in extending a welcome to all visitors and invited guests to the exercises which have been planned for the next two weeks. On their behalf I offer you the hospitality of our building and extend to you the facilities of our library. I would call to your attention especially the exhibition of books on old age which are grouped together in the library.

This Academy started as a local institution to further mutual conferences between the members of the profession and to support a medical library. It has appreciated for some years past that it has much more than that to do and that it has a duty to the public as well, in relation to questions of public health and sanitation and to the general profession of the country in regard to medical education. These duties have been delegated to two committees, one on Medical Education and one on Public Health Relations which have carried on for some time the work of the Academy on these lines.

These conferences on old age have been grouped under the heading of a Graduate Fortnight by the Committee on

¹ Delivered October 1, 1928.

Medical Education. It is expected if it be a success to make the same an annual event and to select each year some subject of general interest to practitioners and specialists alike for discussion by the best experts that the Academy can gather from any part of the medical world.

It is an experiment in graduate medical service and we have attempted it without previous experience. We trust that all our guests will be lenient if at some clinics and at some conferences the rooms are overfilled. We have issued no tickets and adopted no complicated machinery to control attendance, expecting that the divergence of interests would scatter our audiences among the many clinics to be given coincidently at various hospitals and schools. I must ask for your indulgence if our plan should not offer as comfortable and smooth an arrangement as we could wish for.

I take this opportunity to thank the different speakers, many of whom have come longer or shorter distances to participate in our Fortnight, to express an appreciation of the endeavor of the hospitals and medical schools and their professional staffs to co-operate in lectures, demonstrations and clinics and to the committee on arrangements, and Dr. Williams, our Director, and Dr. Reynolds, our Secretary, for their enthusiasm in undertaking the extra work involved.

We have selected for this year's subject "The Problem of Aging and the Diseases of Old Age." It is hoped that we may learn from this symposium, the better to appreciate the distinction between the old age that is inevitable and the pathology of the elder individual which can be postponed or avoided altogether, and I hope we shall all feel the younger as a result of our Fortnight's deliberations which should teach us that there are many troubles from which we do not suffer.

THE DOCTOR—TRAINER OR HEALER ¹

(ABSTRACT)

GEORGE E. VINCENT

President of the Rockefeller Foundation

It is fitting that an aging if not venerable layman should have a part in a symposium on what doctors know about old people and on what can be done to help them grow older more contentedly. His ignorance should prove both instructive and diverting, his fears significant, his desires suggestive even if pathetic. His demands upon the medical profession should at least be heard.

Of the making of new "ologies" there seems to be no end. One fears to see the morning paper lest another has been invented over night. Think of the terminations—too many of them fatal—in "itis" which the doctors have devised in recent years! And now comes the latest, gerontology, the science of old age. One enters a plea for mercy. It is bad enough to be a victim of senectitude. Why embitter old age by committing it to the care of a geriatrist?

This conference of prospective experts is long overdue. It is high time that we should learn more about old age. The layman is confused and bewildered. He cannot make out whether it is a natural and normal thing or a disease. He wants to know what it is biologically, mentally and socially. Can an average man or woman of sixty-five to eighty hope to be fairly fit, reasonably alert and of some use to the community? Or is it only the rare and exceptional person who is likely to reach this standard while the great majority become weak, mentally ossified and a social liability?

Current talk and writing about extending the life span naturally interests deeply the candidate for a saner senility. Too often he misinterprets the statistics. He does not fully understand that the gains have been in the age groups under forty, especially in the group under five. He

¹ Delivered October 1, 1928.

confuses "averages," in which reduced infant and child mortality rates play so large a part, with "expectancies" at a given age. He ought to understand that so far the proof that much can be done to prolong the lives of persons who have reached the age of fifty is not exactly overwhelming. It is precisely on this point that demonstration is so much to be desired.

It would be academic to waste much time on the question whether the aged deserve so much attention from a social order which seems to use people up early and throw them aside. Primitive tribes which live on the brink of famine put old people to death. Modern societies have an economic margin which permits them to carry a heavy burden of work-free children, sick and crippled persons, delinquents, insane and old people who do no physical labor. The sympathy which finds expression in this care for the helpless and dependent is wrought into the entire social fabric and is a vital source of its solidarity. There is no support for the idea of a lethal chamber. Even to let a hopelessly defective baby die by withholding medical aid arouses clamorous public protest.

But a much better case than this can be made out for the social value of old people. Thinkers from Cicero to Stanley Hall have lauded the superiority of old age in reflection, character and judgment. The slogan "old men for counsel" has the momentum of repetition by many generations. In modern society mere physical strength plays an ever dwindling role: mental qualities take the leading parts. To conserve, stimulate and prolong the characteristic powers of old people is to make a significant contribution to the common welfare. This may not impress the young but their parents and grandparents will see and applaud the point.

For a fortnight you are to bring together a good deal of what is known about old age. Naturally, chief stress is to be laid upon the diseases of old age. I say naturally because the very character of your training and the results of your experience lead you to dwell upon the path-

ological. Your business is to detect disease and to do what you can to mitigate or to thwart it. You are primarily healers. You so regard yourselves. You are so looked upon by old people. These resort to you reluctantly when they must. You are associated with the idea of disease, not with that of health.

It would be unreasonable to quarrel with this state of things. You know a good deal about patching old people up or at least about minimizing their pains and I hope about cheering their spirits. But if you are really to make a success of keeping old people going strong, must there not be a change in your attitude and theirs? Must you not become associated in their minds chiefly with health and normality? Must they not come to look to you pretty steadily for counsel? In short, must you not become to them trainers to keep them fit, rather than solely healers to deal with their palpable ills?

One realizes how bored you get by this wearisome repetition of the idea of prevention versus cure. One is tempted to apologize, but, as Woodrow Wilson says in one of his essays, every new idea must go through "a period of much talk." The preventive theory makes progress so slowly, save in the fields of sanitation and epidemiology, that the talk must be kept going without pity or remorse.

An examination of your program discloses an overwhelming preoccupation with disease and only three or four papers which deal with the hygiene of old age. To be sure there is good reason for this. Much is known about disease; comparatively little, I fancy, verified and authoritative about diet, exercise, clothing and mental life of old people. The future trainer or health counsellor will need much new knowledge.

A passing glance will suffice for the theory that longevity is so largely determined by heredity that little or nothing can be done to prolong life. Even if people were like clocks wound up congenitally to run for longer or shorter periods, this misleading simile could be extended

to suggest that oiling and caring for the works are not a negligible means of keeping the timepiece going. This figure can be applied easily to the medical profession. Doctors ought to be like the mechanics who take contracts to keep clocks going and on time, rather than emergency men to be summoned when timepieces stop or are too fast or too slow.

Just as the maturing layman should not be too cast down by the predestination theory of heredity, he ought not to be prematurely hopeful over the sensationally exploited outlook for simian aids to rejuvenation. This subject is to be dealt with in a paper on your program. Your profession can do much good by telling the truth about this and other modern substitutes for Ponce de Leon's spring. Punch's picture of grandfather climbing the window curtains after an overdose of monkey gland provides an admirable corrective.

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a hopeless. is no denying that the health trainer idea will
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technical efficiency of organized medical facilities, the persistence of the curative emphasis the public's apathy towards prevention, the conditions of urban life, make the career of the personal physician less and less attractive. Unless an appreciation of his possibilities and an effective demand for his services can be created, rhetorical praise and tearful lamentations will be equally futile.

To be sure it is altogether possible that such a demand will not be made. Then old people must come to rely upon periodic examination systems, fortuitously discovered specialists, clinics and health centers, widely advertised panaceas, sage if conflicting advice of friends and all the other suggestions about health and disease in which modern society is so miscellaneously prolific. But even so the influence of a fortnight like this will do good. It will emphasize the special problems of old age, stimulate research, and let us hope advance by never so little the idea that health even for the aged can be made a positive goal; not merely an escape from disease.

THE PAINS, PENALTIES AND PROHIBITIONS OF OLD AGE—CAN THEY BE PREVENTED?¹

SIR FARQUHAR BUZZARD

Regius Professor of Medicine, Oxford

The invitation to address you tonight is an honour of which I am deeply sensible and legitimately proud.

It may be that I owe it to the fact that William Osler's academic mantle has recently fallen on my shoulders and may suffice to cloak my deficiencies, or perhaps to that generous spirit which invariably impels you to accord a warm welcome to visiting members of our profession.

May I cherish, at any rate, the hope that my association with the Oxonian home of one who was esteemed and loved

¹ Delivered October 4, 1928.

equally by you and by us, and who did so much to foster our mutual understanding and goodwill, will secure for me an audience full of sympathy and devoid of the faculty of criticism.

In one sense that association was still unbroken when I sailed six weeks ago, but the news of Lady Osler's death a few days later means that I shall return to find a house in Norhams Gardens empty of its gracious and hospitable mistress, and Oxford mourning—the loss of a citizen honoured and beloved for herself as well as for the memories she recalled.

One such memory, perhaps, may be recalled while discussing the problems of old age; I refer to the intense personal interest evinced by Sir William, and maintained by Lady Osler to the last, in the ancient inhabitants of those charming Ewelme Almshouses, of which the Master-ship has been invested for centuries in the Oxford Chair of Medicine.

May I add that their standard prescription for these pensioners was nicotine and not chloroform!

It was, I fear, in a moment of lightheartedness, engendered by the prospect of my first visit to your country, and in a spirit of alliteration more worthy of journalism than of science that I chose the title of "The Pains, Penalties and Prohibitions of Old Age" for my address. Subsequent deliberation has left me humiliated by my ignorance of the task I had set myself and more than surprised at the temerity which prompted its conception. Indeed I must preface my remarks by a prayer for your indulgence in the interpretation I shall put upon these words and for permission to add to them the interrogatory phrase: *Can they be prevented?*

Much attention is being devoted by other speakers to the purely physical aspects of aging and of old age, to the evitable and inevitable changes which sooner or later overtake the more menial tissues of the human body, the bones, the joints, the muscles, the cardio-vascular mechanism, the

viscera and ductless glands. All of these may, and often must, modify in some degree the effective control of man's activity, mental and physical, based as it is upon the integrity of his nervous system.

But like all other bodily structures the nervous system must surely have a life-span of its own, an inherent and individual potentiality responsive to and, in respect to endurance, dependent upon the treatment to which it is exposed. Why, otherwise, should nature allocate to that great healer, sleep, such a generous share of life's scanty hours? Does not such a beneficent provision for the restoration and conservation of our highest nervous forces suggest that we possess a store of energy the economic use and distribution of which are worthy of closer study than they often receive? Realizing the meagreness of material available for scrutiny and analysis, the pitfalls set by our ignorance of the laws of heredity, the complexity of causes and the elusive errors inevitable in estimating effects—realizing all these and recognizing the difficulties besetting an attempt to discriminate between the influence of extrinsic pathological factors, such as may be exerted through the circulation, and that of intrinsic, more physiological factors, such as activity and repose, in determining the expedition or delay of senescence, it requires some courage, perhaps some impudence, to seek an answer to *this* question: Can an individual so order his life as to prolong its prime to the maximum, leaving out of count such morbid hazards in its course as may spoil the score of years?

I am presuming that in discussing this problem of aging and old age, we are really considering the possibilities of prolonging the prime of life to its utmost limits and not of perpetuating indefinitely a vegetable existence. And by the prime of life we mean that phase of maturity during which the highest faculties of the nervous system can be exercised, during which the mind not only lives but is alive. If that be so we can hardly content ourselves with the gratuitous advice offered in daily papers by decrepit

individuals who have survived nine or ten decades and who attribute their longevity to abstinence from tobacco, a vegetarian diet, wholemeal bread, a daily apple or dose of castor oil, but never to medical advice! Can science provide more enlightenment?

In the pursuit of an answer to my question, it may be well to recall for a moment the process by which the nervous system reaches its functional maturity. From infancy, through childhood and adolescence, to adult life the nervous system grows and develops, not by multiplication of cells but by bringing more and more neural centres into action, by creating a wider range of response to external impulses and by opening up and utilizing an increasing number of association paths. To what extent vital activity can be reckoned in terms of reflexes, conditioned and unconditioned, is a question which will occupy the minds of philosophers for many years to come but need not detain us here, although in that sphere of physiology there may be the seeds of a method by which the sensitivity of the nervous system to new reactions will in the future be tested with scientific accuracy. And, perhaps, the period of aging and old age is coincident with the decline and fall of neural sensitivity.

The rapidity of the evolutionary process is notoriously variable in different individuals, in different races and perhaps in different sexes and the same adjective may be applied to the age of its completion; hence the terms precocity and slowness of development. There is some doubt in my mind, however, whether evolution is ever complete, whether there is any stationary phase intervening between evolution and devolution, or whether, in popular parlance, a man ever ceases to be young until he begins to grow old. If that be so, then the prime of life should be regarded as a dynamic, not a static, era.

We may assume that, generally speaking, association paths once opened up and used are available for indefinite periods and, on the other hand, that there comes a time when paths, hitherto untrodden, no longer preserve their

potential right of way. Experience teaches us that the earlier a path is explored in life the smoother it remains, even if neglected for a while. Or, from the more physiological point of view, we shall agree that our responses are quicker and more accurate the earlier they are acquired, and that later on in life certain stimuli, if applied for the first time, elicit incomplete or no replies.

If, then, a man's neural sensitivity is the index of his age, its decline is expressed by his difficulty in retaining fresh impressions, his reluctance to forming new associations and his inadequacy in responding to unaccustomed impulses.

Our attention may now be turned to a consideration of the influence exerted by a number of more or less normal or natural agencies on the preservation of neural sensitivity, and in this pursuit we must not forget a law of wide but not universal application. I refer to the fact that its most recently acquired and its most highly specialized functions are the first to fail when, on the one hand, the nervous system is exposed to certain noxious agencies such as fatigue or various organic and inorganic poisons, or when, on the other, it suffers from a deficiency of certain ingredients normally provided by the glands, the food or the atmosphere. The child is naughty when tired, the youth irresponsible under the influence of alcohol, the steadiest of adults loses all judgment on reaching altitudes of oxygen want, and if, prevailing beliefs are of any account, we should all be giants of prowess if only we could absorb a sufficient quantity and variety of vitamins.

In discussing the influence of some of these agencies I must, perforce, rely chiefly on personal experience and observation, and any deductions I may make have but little claim to scientific support.

The nervous system is guarded against the harmful results of overactivity by the supervision of fatigue, with the result that repeated excess is rarely possible under normal conditions. We know that changes occur in nerve

cells as a consequence of physical action and it is to be presumed that similar alterations are associated with mental exertion. We know that physical rest is capable of effecting restoration in the one case and there is no reason to doubt that sleep has equivalent powers in the other.

When, however, we approach the problem of the permanent effects of excessive and repeated activity, with intervening periods of sleep, on the longevity of nervous mechanisms we must admit our ignorance. It is a popular and to some extent a professional belief that overwork is a factor of importance in the etiology of many morbid processes, in other words, that work may exert the properties of a cumulative poison. Staleness is something which we recognize as a condition from which recovery is easily made, and, in my opinion the view that there are permanent results of overwork commonly responsible for the onset of old age is one which we must accept with great caution, if at all. It is certainly not one's impression that it is the most active or even the most troubled minds that are the first to fail. The desire, however, that the process of aging, and even that death itself, may have creditable references and honorable mention is so human that the belief in this hypothesis of cause and effect is likely to long survive its exposition as a fallacy, if such it be, and to delay for many years the popular acceptance of the lesions of pathological anatomy.

In this connection it is not without profit to recall experiences familiar to all of us—the refreshing, the rejuvenating effects of a change in activity. A sense of intolerable fatigue engendered by intense activity in a limited field may be dissipated in a moment by altering the scene of interest. Translated into terms of neuro-physiology it may be asserted with some confidence that while it is comparatively easy to exhaust the supply of energy in a defined area, it is difficult to deplete the whole cerebral field of its natural resources.

Is it possible that herein lies a cue to one of the principles governing the prevention of the pains, penalties and

prohibitions of old age? I suggest that a multiplication of interests early in life, the opening up of numerous association paths in the nervous system is a measure to be encouraged and one which may well be calculated to check the advances of senility. Is it not true that among those whom we have known as young for their years the large majority have displayed a wide range of interests and sympathies. If the pains, penalties and prohibitions of old age are really preventible, then its pathos may be illustrated by the picture of a man of sixty who throws away his morning paper after reading the Wall Street news or by that of a woman of similar age whose mental appetite is appeased for the day when she has interviewed her cook!

And here I would say a word on the subject of physical exercise in relation to the inquiry upon which we are engaged. Fashions are notoriously fickle but every few years there arises a vogue for physical culture founded partly on aesthetic grounds, but largely on the fallacy that our good health has some relation to the size of our muscles and that violent muscular exertion is a valuable antidote to the poisonous properties of mental effort. I do not hesitate to say that I have seen a number of cases of exhaustion neurosis resulting from this popular conception of hygiene and there is little doubt that confusion reigns in the lay mind in regard to the relative merits of physical culture, the object of which is to develop muscles, and of games of skill, the *chief* advantages of which lie in the fact that they supply *mental* recreation. From the gerontologists point of view, therefore, athletic games are to be encouraged in that they add to the list of *cerebral* activities, to the sum of varied interests. Even when advancing years prohibit personal participation, the role of an understanding spectator is not to be despised.

Change, as a restorative, is no new suggestion, as a preserver of faculties it may be an important factor in deferring infirmity. But the elaboration and criticisms of its possibilities I must leave to your imagination if I am to

avoid the detailed consideration of the arts, muses and 'ologies and the more dangerous topic of polygamy.

In the interests of the human mind the ideal life may, perhaps, be described as a variety entertainment with a first rate comedy as its *pièce de resistance*.

From work and play to food is but a short and natural step and on this subject the comments I propose to make will be brief and to the point.

To the child, the youth and the young adult food is a legitimate and not always neglected source of enjoyment. After forty years of age, it should be regarded as a disagreeable necessity of life and as the chief menace to the preservation of mental and physical activity. A superfluity of food has all the attributes of a subtle poison and indulgence in it all the dangers of an insidious vice. I have no advice, no convictions to offer to the healthy individual on the subject of food except that he should err on the side of moderation, become a slave to no particular diet and pay little attention to the regularity of his meals. An occasional day of starvation is a hygienic measure of much value.

Many, if not most wives, contrive to shorten their husbands' lives, not always an unpardonable crime, by tempting and encouraging them to overeat in middle age. "Feed the brute" is as often a policy of extermination as of pacification! How many of the pains and penalties of old age would be averted if this dietetic principle were observed it is impossible to estimate but their name is surely legion.

No general laws can be laid down. Each individual is a law unto himself and if a man or woman of forty has not learned what kind and what minimum quantity of food suffices to maintain his or her health, the time has come to appeal for medical assistance and advice.

The crime of *lèse-majesté* is, I presume, unrecognized under a Republican Government and I may be permitted to make a short contribution to the liquor controversy in

so far as it is germane to the subject I am considering. The excessive use or abuse of alcohol will, without any doubt, shorten the effective life-span of the nervous system and particularly that of its highest faculties. On the other hand the physiological effects of alcohol in moderate and occasional doses are more difficult to appraise. The fleeting stimulation, followed by the longer but still transient blunting of the finest intellectual and inhibitory processes is a phenomenon similar to, but more rapid than, that which results from normal mental activity followed by fatigue.

It has undoubtedly agreeable and possibly recreative properties and if it exerts any harmful influence on the duration of cerebral efficiency, these are probably proportionate to the frequency of its occurrence.

At the beginning of this address I formulated a question: "Can an individual so order his life as to prolong its prime to the maximum limit?" I hoped to make it clear that the prime of life was intended to represent the acme of mental activity and that no attention would be paid to the modifying influence of the various diseases and accidents with which the path of life may be strewn. My inquiry was for principles which might guide the individual to his goal and has been limited in scope. Only such simple questions as those of work, mental and physical, play, fatigue, rest, sleep, food and drink have passed lightly under review and I ask myself at its conclusion for the principles which have come to light.

One was obvious from the outset—the avoidance of excess, not so much in work as in food and drink.

If there is another it is certainly the promotion of change, change in occupation, habit and diet. In fact the individual seeking to prolong his prime must not *order* his life too much. A judicious amount of disorder and of irregularity should be encouraged. I am conscious that this opinion in regard to the variety of activity and irregularity of habit, as powerful aids to preserving the elasti-

city of the human mind—and after all we desire to preserve our mental elasticity as much as the elastic component of our arterial walls—is not altogether orthodox.

I am aware that there are some who regard with anxiety the rapidity of life made possible by modern methods of transport and communication; and who declare that there is an increased sum of nervous disorders as the result of these changes.

But there is another and happier aspect. The judicious use of modern inventions—and judgment will follow as novelty wears off—will favour the diversification of mental and physical activities and facilitate a wider distribution in the expenditure of nervous energy, an end which, to my way of thinking, is very desirable.

Nervous disorders are most common among those members of the community whose interests are few and whose fields of action are limited. Regular work, regular play and regular meals and regular hours of sleep may be the slogan of the health expert and may indeed be the guide to a prolongation of life. But we don't want to prolong life; we want to put off that evil hour when our mental horizon begins to narrow, our views become more rigid, our tolerance, sympathies, insight and interest less wide. Rather death than life spent under the tyranny of years!

OLD AGE AND WHAT IT MEANS TO THE COMMUNITY ¹

LOUIS I. DUBLIN, Ph.D.

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Interest in the problem of old age is perennial, because we forever grasp at the hope that we may, somehow, stave off those nightmares of life, senility and death. It is, therefore, of the very first importance that physicians in any

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discussion of old age begin with a clear-cut definition. The words "old age" have a wide variety of interpretations, all in good current usage. For twenty-five years, at least, painstaking scientific work has been striving to differentiate between chronologic age and physiologic age. This distinction was at first applied especially to the period of adolescence; but its most significant application belongs to the very period with which we are here concerned. Defining the two terms "chronologic" and "physiologic" brings into sharp relief the problem of aging which occurs when pathologic changes run ahead of normal processes and bring about a premature state of old age. As physicians, you are primarily concerned with old age as a pathological phenomenon and with the processes which accelerate aging. On the other hand, as a statistician, I am more concerned with the chronological aspect of this subject, since that presents definite entities which permit quantitative analysis. Possibly by combining the two points of view we can throw increased light on the whole subject and thereby clarify the social implications and problems which concern old age and aging.

And so, speaking as a statistician, and having in mind chronologic old age, I shall arbitrarily classify as old people all persons sixty-five years of age and over, realizing, of course, that there are all degrees of old age disability from sixty-five years onward to the end of the life cycle. There are a number of definite facts to which I would call your attention in outlining the field with which we are concerned. In our country, four and a half per cent. of the population was, in 1920, 65 years of age and over. This means that there are approximately five and a half million so-called old people in our country. Of this number, 1,680,000, or 1.4 per cent. of the population, are 75 years of age and over; 240,000 or 0.2 per cent of the population, are 85 years of age and over, and there are presumably 60,000 who are over 90 years old. According to the 1920 census, there were 4,267 centenarians. But of this number, 69 per cent. were reported as negroes which is, of

course, far in excess of the relative proportion of the negro in the population. The stated number of centenarians is grossly exaggerated, since many pretend to attain the hundred-year mark who have no right to that distinction. As our census machinery is improved from decade to decade, the number of reported centenarians has become much smaller.

Sex differences among the aged are particularly interesting. There are about the same number of males and females in the entire group, in spite of the fact that males constituted in past years a much larger proportion of the immigrants. In 1920, in the age period fifty to fifty-four, there were 115 males for every 100 females; in the sixty-five to sixty-nine year group, there were 109 males; between seventy and seventy-four, there were 103 to every 100 females. But from age seventy-five onward the relations are reversed and the number of females greatly exceeded the number of males. After age ninety, for example, there are three females for every two males. The increasing proportion of females to males at the older ages is clearly the result of the woman's much lower mortality at the advanced ages; but this statement likewise holds true throughout the entire range of life. Were it not for the heavy additions of male immigrants, females would far outnumber males at the age sixty-five and over.

The proportion of old people in our population is constantly changing. As I have said, at the time of our last census they constituted four and a half per cent. of the population. But in 1850, the ratio was only 2.9 per cent. We were then a young and vigorous country growing very rapidly as a result of high fertility and the heavy immigration from Europe of young people. The last seventy years have seen marked changes in our demography which are becoming more and more accentuated with each decade. As in other countries, our birthrates are constantly declining and are now only a little more than half of what they were fifty years ago. Nor is the end in sight! At the same time, we have seen fit to close the gates to immigrants from

abroad who supplied us with large numbers of young and vigorous people. We may, therefore, look for an ever-decreasing proportion of young together with an increasing proportion of old people, because as we lower the scales in one direction they go up in another. We have recently calculated that if the present fertility and mortality continue unchanged we shall have, ultimately, more than nine per cent. of our population over 65 years of age. And if, as seems very likely, our population becomes stationary, or a condition is reached when the birthrate and deathrate actually balance each other, then we shall have a population in which 10.7 per cent. will be 65 years of age and over. In other words, out of every ten people more than one individual will then have to be classified as old.

I need hardly dwell on the significance of these changes which have been taking place and which will continue to go on under our present customs and our recent immigration legislation. It is obvious that an increasing proportion of old people will affect very seriously the mental atmosphere in which we live. It will also influence the amount of relief necessary to care adequately for the aged thus producing new social and economic problems. But today we are more concerned with the problem of old age as it confronts the physician. Let me raise, as the best approach to this subject the following questions: Has the increasing proportion of old people carried with it longer life? And has our capacity for longevity increased with our ability to bring a larger number of people into the period of old age?

Much confusion has existed on this score. In recent years, the lives of infants have been spared in large numbers and the mortality of young people has been materially reduced. Consequently, the average length of life of the community as a whole, has unquestionably been greatly increased. The usual measure of this average duration of life is known as the expectation of life at birth. In 1840, this figure was, in the United States, approximately forty-one years. It is now rapidly approaching 60 years.

In other words, there has been an extension of almost fifty per cent. in the average life expectation. But as I have said, this is due largely to the saving of lives at the younger ages. When a baby's life is spared, there is a high probability that a large number of years have been added to the total score of the community. On the other hand, there has been hardly any extension after age fifty. In 1840, the expectation was about twenty years at age fifty, which means that the chances were even that a person 50 years old would reach seventy years. In 1920 the expectation at that age was only twenty-one years, making the gain in the interval of seventy years almost negligible. That shows that the life span itself, that is the ability to round out a long life, has been affected hardly at all by the newer developments in hygiene and by the improved economic conditions of the last half century. Moreover, the diseases and conditions which predominate in old age have not come under control. Cancer, as everyone knows, is even on the increase, and Bright's disease and heart disease show little tendency to decline. In fact, heart disease and the other so-called "degenerative diseases" have come into greater prominence and are now by a very large margin the leading causes of death. We may, therefore, say that even if there is a larger measure of life for the average man in the community, we have by no means learned how to stretch the life span itself more than a very small fraction. The biblical limitation of three score and ten applies as much to-day as it ever did.

But constantly it is suggested that this condition need not endure and that the life span itself can be extended so that it shall keep pace with future additions to the average life expectation.

It is often claimed that the process of aging in most cases is premature; that it in reality results from illness or some pathological process, usually unrecognized, which produces functional and structural disturbances causing old age and death. Those who hold this view have much evidence to fall back upon. It is only too true that care-

ful physical examinations of adults show that many apparently in good health are already suffering from disabilities of greater or less importance, including impairments of the heart, of the kidneys, hardening of the blood vessels, serious overweight and a hundred and one other conditions which indicate that all is not well with the human machine. In many instances, such impairments can readily enough be traced to previous infections or to existing infections. In other instances, they are probably the direct result of poor personal hygiene, such as over-eating or other bad habits, which throw the entire physical and nervous mechanism out of gear.

Reasoning along these lines, it is further claimed that these impairments are not at all normal or necessary, but rather fortuitous and unwarranted factors which break into our lives and which can either be prevented altogether or checked so that they need do no serious damage. The all-important consideration is that they shall be discovered in their incipency and treated in a sensible manner through medical care. Those who believe this, assert that through the discovery of such impairments and their proper treatment, the process of aging can be staved off for a considerable period of years at least, so that ultimate senility and old age may be delayed twenty years, thirty years and perhaps even longer. These proponents of a metamorphosis which will result from good individual hygiene believe that they have solved the question that I raised very definitely. According to them, the life span can be materially lengthened and concomitant with this will go an extension of life expectation. They believe that the life span will reach beyond the century mark and well into the second century. Professor Fisher of Yale University is especially eloquent in his claims that human life may soon be lengthened well beyond the age of a hundred years and that this heritage of a happy old age may be available to a very large portion of the people.

My own work in this field makes me more conservative than Professor Fisher. Some years ago, when I investi-

gated intensively the problem of the life span, I arrived at the conclusion that, with the limitations of our present knowledge, the deathrate can not be materially reduced after age seventy. On the other hand, the deathrate can still be cut down at the younger ages, somewhat less through the whole of middle life and slightly up to the very threshold of old age. Such improvement in the deathrate would, of course, result in bringing more and more people into the period of old age. But after they arrive there, they will be subject to the same forces which have been operating for some time and will continue to succumb to these at about the same rate. I now believe, however, that my earlier point of view may very well prove too severe a limitation on human ingenuity. We have not yet exhausted all the possibilities which modern medicine puts at our disposal. Is it not possible that through the application of community hygiene on an ever-increasing scale we will overcome the ravages in adolescence and early manhood of the communicable diseases, diphtheria, scarlet fever, measles, typhoid fever, and even of pneumonia? As we cut down the number of such diseases, will there not be fewer impaired hearts, kidneys and blood vessels and will there not be larger numbers of persons arriving on the threshold of old age in far better physical condition than they are now? And may we not hope, likewise, that the application of the rules of correct personal hygiene will accomplish much in attaining even better results? If the findings of physical examinations were taken seriously by more people and steps were instituted at the beginning of disease processes to check the ravages of the pathological conditions discovered, would not larger numbers of persons outwit death and arrive at old age with greater vigor and consequently with a longer life expectation? It is hard to see how such conclusions can be disputed in the light of the experience of the last ten years.

The annual physical examination made under good medical auspices and followed up with enthusiasm and intelligence is the key which should open broad vistas in staying

old age and in extending the life span. Studies which we in the Metropolitan Life Insurance Company have made during the last ten years show conclusively that the periodic physical examination can be made a potent factor in life conservation at the older ages. In 1914, the Metropolitan offered certain groups of its policyholders the benefit of a medical examination at the expense of the Company. Later, we tabulated and analyzed the subsequent mortality history of the first 6,000 persons who were examined in this experiment. The records covered a period of nine years and we found a saving of 18 per cent. in the expected mortality of the group as a whole. We found that the improvement in mortality was greatest during the first five years after the examination. Thereafter, the gain declined year by year until in the ninth year, the mortality experience on the examined lives was virtually the same as that of the whole body of Ordinary policy holders which we employed as a control. One of the great surprises of the investigation was the fact that a group of about 1,400 of the original 6,000 who showed such serious impairments at that time as to make them ineligible for standard forms of life insurance gave a mortality only slightly in excess of that expected according to the American Men Table. It is difficult to understand such a result except on the assumption that these persons when informed of their physical defects were particularly careful to get good medical advice and care, to improve their personal hygiene, and to do the other things that their medical reports indicated. There is much evidence to show that this very thing happened; for many of these people took advantage of the offer of the company over a series of years and the subsequent records showed that many overweights corrected their conditions; others improved or entirely eliminated their faulty habits; still others were able to eliminate the presence of albumin and casts in their urine and other defects were likewise corrected. The later reports indicated that the medical advices which had been given were taken seriously. In no other way, can we explain the very low mortality the company experienced on the group of policy-

holders who accepted the privilege of the physical examination.

We, in the company, consider this experiment a profitable one not only to the policyholders but to the company itself. A saving of 18 per cent. in mortality when translated in terms of reduced death claims and increased premiums much more than paid for the cost of the examinations. In fact, our estimate at the end of the first five years was that the company had received two dollars for every dollar it had paid out for the examinations! It was for this reason that the executives of the company have constantly broadened the scope of the examinations to include an ever-increasing group of policyholders. At the present time, the privilege of the examination is taken advantage of by a group of a hundred thousand ordinary policyholders a year. Over 600,000 have already availed themselves of the company's offer. In the meanwhile, a large number of other insurance companies have offered the same privilege to their insured and many employers have done likewise for their employees in shops and factories. We who are closest to the operation of the annual physical examination believe that this is a clear-cut method of adding years to the life span of the average man.

The disparity between chronologic and physiologic old age can, therefore, be bridged. It is the thesis of this paper that sickness is the main cause of premature aging and that much of it is preventable. To summarize our argument, community hygiene, on the one hand, will in the future reduce the number of cases of the communicable diseases and obviate the dangerous sequelae to the vital organs; but personal hygiene, on the other hand, guided by the increasing interest of the medical profession will stay the processes which lead to organic degeneration. What these combined forces will do in lengthening the life span is still a good deal of a question. I have no such optimism as Professor Irving Fisher, but I do believe that the outlook is good for adding whole years to our present allot-

ment. The measure of success will depend largely on the enthusiasm and understanding with which this double-headed campaign can be launched. But before we can even plan such a campaign, we must have a better command of the facts and know more than we do now of the underlying causes of mortality and of morbidity, especially at the middle ages of life. We are, to-day, woefully lacking in knowledge of the processes which produce aging and degeneration. Research into the causes of such premature aging would yield information of inestimable value. Fortunately, the files of physicians contain the facts upon which a wise future policy must be based. If they kept full and accurate records of their cases of the degenerative diseases, it would be a comparatively easy matter later to determine some, at least, of the processes which we must combat. Possibly no better result could come out of this symposium on old age than the organization of such a coöperative research into the causes which make for premature old age. Every physician in practice can play his part in such a venture.

DIETETICS IN OLD AGE¹

SAMUEL A. BROWN

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When we are young I think most of us wonder why anyone desires to live to old age, with its physical difficulties and mental deficiencies. In middle life we become more tolerant, thinking there may be some excuse for becoming old; while after we pass sixty, and are very sure it is most desirable, we will attempt almost anything which promises to prolong life, even if our ideas on the subject are vague, and procedure uncertain. Leaving aside, therefore, the large question as to what practices in youth and middle age may reasonably assure a long life (questions of much depth and complication), we shall confine ourselves to those already old; considering whether through

¹ Delivered October 4, 1928.

forethought in diet, they may expect even longer life, and that with health and easy regulations alone.

The discussion of "Dietetics in Old Age" necessitates encroaching upon topics assigned to other speakers, but I shall endeavor to minimize this intrusion as much as possible.

Age is a period associated with innumerable theories. Each individual who lives a long while ascribes his success to some particular pet theory. In one instance, to the moderate use of alcohol; in another, to the abstinence; in another to its frequent use. One to the fact that he has never smoked, and another to the fact that he has, giving him mental relaxation, as well as stimulation of the intestinal tract. There are many peculiar and individual diets, such as a one-type diet, infrequent eating, frequent eating of small meals, this or that particular kind of food, and other rational or irrational theories; but in the final analysis it is probable that most people who live to old age have come from long-lived families. This tendency may be modified, of course, by indiscretions of diet, mental activity, or physical work, but the essential is that we find in certain families a tendency to live long extending through many generations, just as in others we see the contrary. It is probable, therefore, that the first requisite for longevity is to be born with such a tendency.

Moderation is the key-note of dieting in old age, and I quote the following from Osler as probably best expressing the attitude we should assume in this period of life:

"The famous George Cheyne, a man of enormous bulk, reduced himself by dieting from 448 lbs. to proper dimensions. One of his aphorisms says, 'Every wise man after fifty-eight ought to begin to lessen at least the quantity of his aliment; and if he would continue free from great and dangerous distempers, and preserve his senses and faculties clear to the last, he ought every seven years to go on abating gradually and sensibly, and at last descend out of life as he ascended into it, even into a child's diet. Put in other words, it reads, 'after fifty years of age we eat too much.'"

I have in mind two brothers, one ninety-two and the other ninety-eight. The elder ascribes his age to the fact

that he has been a very frugal and simple eater, never taking more than two meals a day, and frequently only one. In addition to this he abstains totally from alcohol and tobacco, and is convinced that he can live for an indefinite period. The younger brother, who at ninety-two has lived generously, over-eaten, and used alcohol freely, thinks in turn that he has been able to maintain his health and strength because of the food and alcohol he has consumed. It again but illustrates the fact that as we get older everyone has a pet theory to account for his living to old age. The investigation in this particular instance revealed that the father of these two men died at ninety-eight, and that his ancestors before him were very long-lived.

Closely associated and directly related to the question of diet is that of relaxation in old age. By relaxation I do not merely mean sleep, in fact old people require less sleep as a rule, but ability to relax mentally and physically can be cultivated as a habit. It must be done systematically and if properly carried out will greatly facilitate and aid diet in prolonging life. I have in mind an individual who in middle life was condemned to short life and sure death, due to over-eating, over-work, and many other over-activities. He is now eighty-seven years of age, and his good health, in my opinion, is largely due to the fact that he was able to teach himself to relax. From four to six o'clock every afternoon he goes to his room, and no communication of any kind can be had with him, either by telephone or message. He is entirely out so far as every activity is concerned, and knows that he is not to be disturbed. He does not sleep, but has developed the art of physical relaxation to its maximum. At the end of his period of rest he is almost rejuvenated. He has carried out this plan through many years, and in spite of the fact that he is rather a generous eater and smokes immoderately, he is an active old man and thoroughly enjoys life. Incidentally at eighty-seven he made two trips to Europe this summer, which is his custom, returning to New York about the first of August because he says that "in England they do not know how to cut hair," immediately sailing again to com-

plete his summer vacation abroad. It is easy to see from the above facts that he is a man of many theories, but the practical point is the fact that he has learned to relax, and this associated with a perfect digestion, has made him a happy old man.

The question of alcohol is important, and whether it has any food value or is purely a stimulant has been often discussed. It is not necessary to go into this controversy, and I am only expressing my own personal views in saying that I am very sure that alcohol in moderation is most useful for people after sixty years of age, or for those even younger if old age is premature. It is a pleasant, quick stimulant, and even if devoid of food value, which is debatable, aids digestion, picks up the circulation, stimulates the cerebrum, and makes the picture prettier and the day shorter. This in itself seems to be of great value for those in the latter stages of life.

In arranging diets we must distinguish between the individual who is old in point of years, and the one who is physiologically old; who in other words has acquired his old age from dissipation, excessive work, bad hygiene, etc., and thereby becomes old prematurely. It is necessary to give a higher protein diet to this second type than to those normally old, since protein is necessary for the cell repair; and the mistake of classing all these cases under one head is often made. While for ordinary old age protein may be cut very low, in the latter type, due to depletion, at least three calories per pound of body weight are needed against the one and one-half sufficient for the true old age types.

People who desire to prolong life through food regulation should begin with the careful construction of balanced diet in middle life, gradually cutting down the protein as they advance in years, but maintaining the balance always. While there may be exceptions, the evidence is all in favor of properly balanced mixed diet throughout life. Starting during the period of activity with a considerable factor of protein, carbohydrates and mineral

salts, the first two should be gradually decreased, but in a logical manner.

Starvation should be avoided, and it seems that many people would be much happier if they could be prevented from punishing themselves with the many unabridged theories that are so much in evidence. It should be remembered, however, that if an individual has established a diet for himself through experience and study which has satisfied his requirements over a period of years, it is best not to disturb or change his habits even though we may feel that they are scientifically incorrect. Sudden modifications are apt to be disastrous in this period of life. It is quite essential that regularity be stressed in the feeding of old people; and if they are underweight, frequent eating in small quantities is advisable. Without any doubt milk, or milk products, are the most satisfactory foods for old people that we have, for they contain all the elements of food, and are most easily digested. Metchnekoff's work with his sour milk, while it was a disappointment to him in as much as it was not a panacea for old age, and did not prolong life indefinitely, as he had hoped, undoubtedly has much merit. The more recent modification with the acidophilus, the advocacy of the sour goat's milk, with many other products of this kind, form a type of diet that is distinctly beneficial for many people.

A mixed diet in proper proportions is probably without question most sane and efficient on the average. Fruit, eggs, fish and vegetables, with the exception of peas, beans and cabbage, unpolished rice, sage, arrow-root, tapioca and bread puddings are easily digested. Rice puddings and pastries should be avoided. Cooked or fresh fruits may be taken freely, as they contain many of the salts necessary for life and are free from the toxic effects of protein. This element of the diet, to my mind, is not utilized sufficiently by old people.

There are many differences of opinion regarding the proper number of calories necessary in old age. Roughly speaking, from 1300 to 1500 a day should suffice, while

50 grams of protein, 120 of carbohydrates, and 30 to 40 of fats, are about average; yet this differs again with the individual. When a stage is reached where teeth have been removed, protein must be cut down because of the inability to masticate, but this loss of protein may be equalized by an increase of milk and eggs.

A further serious problem of old age is over-eating, which in many instances is more habit than a desire for food, since the sense of taste is greatly diminished at this time, and large amounts of salt or seasoning are often required to make food palatable. Tendencies toward retention diseases, such as gout, rheumatism, kidney deficiency, high blood pressure, and such conditions are easily developed from this source. We must remember that not only is less energy needed, but there is a deficiency in function and cell activity which prevents proper elimination, and therefore indiscretions in feeding, cause accumulations even with relatively small quantities of food. The best results are usually obtained when the day is divided into periods of three hours so that five or six small meals are taken.

Reverting again to the question of alcohol, it is my belief that beers and malt liquors have a decided food value in old age, and that small quantities of sherry, port, claret or sautern at meal times aid decidedly in stimulating gastric digestion.

We are also often forced to counteract the tendency of old people to refuse vegetables; the reason usually given being that they produce flatulence. If properly cooked and slowly eaten, however, this objection may be largely overcome, or if necessary artificial digestants such as pepsin and hydrochloric acid may be added, for moderate consumption of such foods at this time of life is generally advisable.

There is a close relationship, too, between sleep and feeding in old age, and it is essential that ample sleep be obtained. It is often necessary to give a glass of hot milk or

richy and milk, or a little hot liquid food of some kind at bed time in order to induce proper relaxation. If there is any tendency on the part of age to develop obesity, the diet should be modified before this becomes burdensome. On the other hand, any tendency to lose weight should be watched for with equal care, and the quality of diet altered as the case demands. In other words, maintain a balance in which neither excessive gain nor excessive loss becomes a factor.

Great care should be observed to correct any tendency for constipation, which in the main would probably be due to a poor muscle tone. At the same time its presence accelerates the tendency to putrefaction in the intestinal tract and produces a retention toxemia which may become a matter of some seriousness if it is not corrected.

Whenever possible the noon meal should be the main meal for old people, and a positive prohibition should be placed on any exercise immediately after meals. There is a tendency for older people, particularly men, as a result of a sense of vanity, to endeavor to display their physical powers; I am especially referring to golf, and there have been a number of disasters as a result when this exercise is taken immediately after meals.

If there is any tendency to hypertension a chemical study of the blood should be made, and a restriction or practical elimination of the sodium chloride from the diet.

Many diets have been arranged for old people, but I know of nothing better on the subject than a quotation from Doctor George S. Keith's "Fads of an Old Physician," which was written in his seventy-eighth year, and is as follows:

For breakfast I have a large cup of tea, with milk or cream; brown bread from two to three ounces; and usually one and a half ounces of fish, or half that quantity, and that very rarely, of bacon. Sometimes for a few days I take a cup of coffee with half milk, but no fish or bacon. Lunch is a cup of cocoa or chocolate, if the weather be

cold; and if it is warm, a small tumbler of milk, about six ounces, with the same quantity of bread as at breakfast. At both meals I use butter, not a quarter of an ounce, and quite as much jelly as marmalade. This is my usual lunch, but occasionally instead of cocoa I have a baked apple, or some prunes with milk, or strawberries with cream so long as I can get them, or, very rarely, vegetable soup. When I have no milk I usually take a morsel (not half an ounce) of cheese. At 4 P.M. a small cup of tea, and sometimes biscuit or cake. For dinner, at 7, which is my chief meal, I have soup, from peas, lentils, potatoes, celery, carrots, etc., the first two made with no meat stock, and the others with a little from lamb or a bone; or fish soup, the only animal soup I indulge in. Fish, mostly white deep-sea fish direct from Montrose; of this I take no more than three ounces, with a potato and always another vegetable fresh from the garden. If there is no fish, I may take once or twice a week an ounce or two, certainly not more, of lamb, game, rabbit or tripe; but often I have neither fish nor flesh. The dinner ends with stewed fruit with cream, or pudding or fruit tart; of these I take a fair helping. During the winter season, instead of fruit or pudding, I often have celery, with cheese, oatcake and butter. On this diet I enjoy the best of health, and for my age am up to a fair amount of exercise, walking three to six miles daily in good and sometimes bad weather, and usually part of this is up a steep road with a rise of 250 feet. The only confession I have to make is that when at home I do not rise till I have had breakfast and read the newspaper. This is a habit I have recommended to many approaching my own age, and those who have tried it admit that they are stronger for the rest of the day. I enjoy breakfast just as much as any other meal, though I never feel what can be called hunger, and have not done so for many years. I could omit a meal at any time without discomfort. This I have long looked upon as the best proof of perfect digestion. During very warm months I take rather less bread and butter, and I do not try to make this up by taking anything else."

In conclusion, therefore, let me repeat, that although the most general causes of extended life are undoubtedly hereditary, much comfort and physical well-being may be gained by old people if they will moderate and take heed to their eating habits; which advantages in helping to sustain life must obviously protract it. The diet of old age, therefore, should be mixed, simple, small in quantity, and there should be frequent feedings, up to five or six a day. Emphasis should be laid on the fruit and vegetable factors, and great care taken to prevent accumulation and retention, especially of protein, for nourishment is always concerned as much with output as input. In addition, habit should be studied carefully in regulating or prescribing any diet for a person of advanced years; since it is well to remember that foods that are palatable to a man will generally be more easily digested and nourish him more than those of greater potential value, eaten without relish; and the habit of relaxation should be cultivated as an adjuvant of diet. In addition as previously stated, I personally consider alcohol in the form of beer or malt liquors to have a distinct food value.

PHARMACOLOGY IN OLD AGE ¹

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To be asked to discuss the pharmacology of old age seems to be at first thought, as broadly indefinite as if one were handed the pharmacopeia, and was asked what was in it.

Even with all the drugs at our disposal, however, the existence of old age strongly limits us in many ways. Age, like childhood, requires in general a diminution of the dosage to be given of any individual drug, as some drugs, such as morphine and belladonna, or even digitalis are definitely not as well borne, while others are much better

¹ Delivered October 4, 1928.

borne in old age than in early life, as iodine, or nux vomica, or alcohol, but in general, we must deal gently in the matter of dosage, as we must in other things with the aged.

The viewpoint of therapeutics has changed greatly in the last 30 years, whereas formerly the endeavor was made to control the symptoms, which were the annoying factors complained of by the individual, and where the basic factors of the disturbance of equilibrium in the normal glandular processes were unrecognized, because unknown, there is at present an increased use of glandular extracts, instead of drugs, to control the basic condition, through the modification of which the symptoms will disappear.

It has become increasingly evident that often hygienic care in the daily existence of the individual, will do more for him than treating his symptoms of disease. Regulating the existence of the individual will often prevent the necessity of dosing them with any medicine, and will lengthen in them a comfortable existence.

Many of the discomforts and many infirmities of old age can, however, be ameliorated by many simple remedies, and a knowledge of the physiologic action of drugs is often of great use in relieving chronic ailments and discomforts from which old people suffer. It is a grave mistake for young physicians, and really if one looks at it cold bloodedly, much against their self interest, to think that old age must necessarily suffer, and nothing can be done, and to look upon chronic incurable diseases as conditions in which amelioration, and often comfort, cannot be produced by the use of various remedies that are given deliberately to alter and control the symptoms complained of. But all this takes time, and the pharmacology of the aged demands more of the art of the practice of medicine than in any other group of patients. One must learn to unravel the real from the imaginary, and one must learn to listen to many reiterations, but the mere fact of willing attention, cheerfully bestowed, is often in itself the best remedy to rule out many imaginary ills.

In the present symposium many papers will be read on special subjects which will deal, not only with diagnosis and etiology, but with their treatment also, much more in detail than any discussion that can be offered to you in this paper.

Old age is limited in its activities, because the vigor of the human mechanism is diminished, but that does not mean that it should be a period of suffering and unhappiness, or discomfort. One must remember that there is a condition of the tissues, and the body, which is relatively normal for a person of that age, both in the period of senescence, as they grow old, from 60 on, and when the further limitations of the processes of degeneration have gone on so that there is a distinct evidence of the degenerative processes in all the tissues.

In treating the aged, however, one must not believe that it is possible to bring them back to the vigor of their middle age, but they can be made comfortable, and allowed to go on within the limits normal for their time of life.

Pain, however, is not normal at any time, and the medication of pain giving the desired relief, brings with it an invariable reward in the thankfulness and appreciation of the patient. Morphine by no means is the only medication that stops pain as in neuralgia, or severe neuritis, or the grinding pains of aching joints, or the headaches, and the various other painful afflictions, or even the pain of an inoperable growing tumor. There are many analgesiques which safely relieve pain, especially in certain combinations. For instance, the salicylates, either as sodium salicylate, or as asperin, or some times as Salophen combined with soda bicarbonate, and added thereto phenacetin, or pyramidon or antipyrin combined in small doses, as for instance 3 to 5 grains each, and given as a dose, and repeated in the hour, will often relieve pain much more effectively than when given every 2 hours, every 4 hours, or in a routine manner. This is particularly true in attacks of herpes zoster, which afflicts painfully the aged people.

Often two of these analgesiques combined, such as phenacetin and antipyrin, or pyramidon and antipyrin, or pyramidon and phenacetin will act much better than a double dose of either one singly. Acetanilid is effective but it is not as safe as the other analgesiques.

If codein is added to increase the analgesique powers of the coal tar preparations in any of the above combinations, it is much more effective than a double dose of either the codein, or of the other analgesiques alone. Old people in my experience, bear codein well, and codein has not the habit forming qualities of morphine, it is excreted by the kidneys, and not by the bowels as is morphine, and is not held within the body as long as morphine, nor has it the narcotic value in the effect produced that morphine has. In a rather extensive experience of habit forming drugs, I have seen very few codein habits, so few compared with the amount that I have used, and seen used, that the lack of habit producing qualities of codein is a striking peculiarity of the drug, considering its analgesique properties, and its sleep producing effectiveness. Codein mixed with a combination of the salicylates, sodium bicarbonate and one or more of the analgesiques produces a very effective pain-killing medication, and given in a small dose of $\frac{1}{2}$ grain, or $\frac{1}{8}$ th of a grain, or even up to one or two grains if necessary, it is the most successful and useful combination that we have. Codein is easily broken off if one wishes to discontinue it without the disagreeable withdrawal symptoms, or disagreeable symptoms of any kind. In this it differs from morphine, for morphine, if persistently given for 2 or 3 weeks for pain, does on withdrawal produce the sense of discomfort, restlessness and annoying nervousness that may even amount to distinct suffering.

Even small doses of morphine, continued for three weeks, are liable to establish its narcotic habit forming properties, with the longing for more, and I do not believe that anybody is free from that possibility. In old people $\frac{1}{4}$ grain of morphine is a large dose.

Old age differs from youth in that, when it seeks a narcotic, it does not seek either in morphine or alcohol an inhibition of restraint such as youth desires, but it seeks the relief of forgetfulness, and the obliteration of its pain, or its mental troubles, and the narcotic desires of old age are the strongest of all, because it is the desire often to forget the irredeemable past, and the memories of it; but codein does not bring that narcotic comfort, it is a pure analgesique, from which recovery is sharp, and not prolonged.

Old age is not so subject to sleeplessness as middle age with its wear and tear and incessant worries and struggles. The diminished vigor of the cerebral circulation of the aged in itself tends to bring about drowsiness, and old age, with its reduced activities, does not require as much sleep, and wakes earlier, nor does it spend the weary hours of wakefulness where the worries and anxieties cannot be solved, as in middle age. But the fear of not sleeping will often terrify the aged, and must be considered. If pain keeps the aged awake, with a combination of 5 grains of trianol with one or two grains of codein given in a little warm milk, or with little food of some kind, for trianol will not act quickly unless given during the process of digestion, a very satisfactory slumber is obtained. Trianol is infinitely better with less disagreeable reactions than the barbituric acid group of veronal, medinal, dialciba, baritol, allonal, luminal, or any one of that group, for with them is apt to be left behind the heaviness of too much drug, and there is something in the barbituric acid radical that perverts the emotional values of personality, so that a good natured patient of kindly personality is often turned into an irritable, irascible, sharp tongued person that prefers to say the mean thing rather than leave it unsaid, and prefers to refuse to acquiesce in any thing rather than to co-operate with his family or physician.

I have seen sudden attacks of dizziness and injuries from falling due to the disturbance of the equilibrium, from the use of medinal in ordinary 5 grain doses, and I

have seen in the same patient a distinct hemianopsia, all of which cleared up when the medinal was cut off. The patient's symptoms puzzled me greatly, for I could obtain no history, until his obstinate ugliness became so marked that it seemed as if his unreasonableness could only come from a drug poisoning, which proved to be the case.

I do not mean to say that all patients will be poisoned and perverted in this way by the barbituric acid group. I have, however, seen this perversion and poisoning from every one of its preparations that I have yet encountered. The barbituric acid group in an alcoholic solution needs less of the drug to produce soporific effects, and also acts more quickly. But the toxic actions also occur with smaller doses. Any of the barbituric acid group are unquestionably habit forming drugs, and when used in excess may even produce a distinct psychosis from which it may take weeks to bring about recovery. Habit forming factors may also be said to reside in trianol, but the excessive use does not disagreeably pervert personality, and the patients that I have seen with the trianol habit, have been gently and good naturedly demented, and easily managed without the ugliness of the barbituric acid group.

One cannot speak of pain in old age without bringing up the distressing picture of the forms of arthritis, which are so crippling to the aged. In this period of life the real rheumatism that tends to leave the joints uninjured is rare. The gouty, non-infected joints, and the acute stages of gout are often relieved best by the tincture of colchicum pushed until purging begins from it. Another effective preparation is the French capsule of Colchisal, given for several days in diminishing doses, or given in 5 or 6 capsules 3 times a day until the purging is noticeable. Local applications of menthol and methyl salicylate ease the pain. For the continued relief, after the acute pain has subsided, the colchicum does not suffice, and the tonic treatment of iodine in the form of the potassium iodide, or better, the iodide of iron, is a very effective tonic given in not too large doses, that is not in the 15 or 20 minim doses

often given, but persistently kept up in less than 10 minim doses after meals, it will often stimulate the general nutrition of the patient, and with its stimulation of the thyroid, and its improvement of the anemia, benefit greatly the general health. The improvement of the general health of the patient is important, as gout in old people is often produced as a symptom of exhaustion, or as an idiosyncrasy against the ingestion of some definite kind of food, rather than the expression of the excessive eating and drinking as in middle life.

Since the dangers of focal infections have been realized, and their causal relationship with arthritis known, one sees less than formerly of the infected joints in the aged; the best treatment is that of vaccines. Small doses of a stock vaccine, and with a small number of bacteria in each dose, rarely above a total of 1,000,000 of mixed staphylococcus, streptococcus, with or without colon bacilli will, if given every 3 to 5 days, and persisted in for a number of weeks, given as the patient can best stand it, without systemic reaction, in the end stop the painful processes, and improve the condition.

The autogenous vaccines when given in large doses seem to result, in my observation, in causing a terrific reaction, often defeating the results desired. The foreign proteids, as milk, seem definitely to be effective in ratio to the number of the dead bodies of the bacteria in the sterilized solution, and it would seem that the dosage could be more accurately regulated when a stock vaccine is taken of bacterial proteid of known amounts.

The belief that a fever and reaction is necessary for the production of relief, in my experience has proven to be an unfounded belief. The best results in the relief and cessation of pain have followed more quickly and evenly when the small non reaction giving doses have been used over long periods of time; the relief from the pain is soon noticeable, and if persisted in this method gives gratifying results.

Digestion in the aged, like all functions is often impaired. Thewlis draws attention to the fact that the indigestion of the aged is relieved better by alkalies than by acids, and it is noticeable in giving nux vomica and hydrochloric acid to the old person, they soon find that they suffer from a sense of excessive acidity. That main stay to the medical profession of therapeutic procedure, soda and rhubarb, is most valuable in these patients. Many patients dislike the essence of peppermint that is put in the official mixture. In many of the aged small doses of quinine act as a stimulant, and in giving soda and rhubarb, if instead of the peppermint, two or three drops at each dose of the compound tincture of chincona be added, the soda and rhubarb forms a vastly better digestive mixture. It is not necessarily a large dose of the bicarbonate of soda that is needed, for even a grain or less to each teaspoonful is efficacious. The pleasures of eating are one of the few pleasures that many of the aged have left, and naturally they are prone to cling to it as long as possible, knowing full well that if they give up the pleasures of the table, they give them up for good, but dietary management of the aged is not in the pharmacology, and I leave it to my confrere, to whom it belongs.

In the constipation of the aged, and in some few who persistently can not refrain from over eating, an effective laxative, or even a vigorous purge is not harmful, and often is beneficial. Even in the aged, dietary regime can effectively assist, and even control constipation, but the muscles of the colon lose their vigor as the muscles of the rest of the body do, and a very useful and effective pill is the compound rhubarb pill of the pharmacopeia, two at night is usually an effective dose, and it is especially valuable, because of its content of aloes, each pill containing $1\frac{1}{2}$ grains, and aloes act especially on the lower portion of the colon. Cascara sagrada is an excellent laxative, acting especially well in its aromatic fluid extract, and can be taken for a continued length of time, longer than most laxatives, without lessening its effect, for all laxatives tend to diminish in effectiveness as is well known. Senna, as

in the compound licorice powder, or as the confection, or as prunes and senna leaves acting on the muscle of the intestine, is often effective for a while, when the continued use of some other laxative has lost its effect. Its action is somewhat similar to that of castor oil, although not so effective as this well known purgative, and castor oil is the most effective of the purges in all ages. Calomel in divided doses, up to a grain, seems to be better borne than the single larger doses, but often the old fashioned form of blue mass is extremely well borne, and 2 to 3 grains of blue mass, combined with a compound extract of colycinth with either a dose of ipecac, or of extract of hyocyamus to prevent griping, is an old fashioned but very effective purge to clear out an over loaded colon.

As the rectum in old age tends to lose its folds, and to lose the tonicity of its muscles, and become flaccid, the aged are prone to have impaction at this point. The most effective solution to break up the mass that has formed is 8 ounces of water, $\frac{1}{2}$ ounce of solution of peroxide of hydrogen, and a teaspoonful of bicarbonate of soda; the peroxide of hydrogen is not a permanent solution, unless in the presence of acid, and the acid solution forms a very marked irritant to the rectum; the bicarbonate of soda neutralizes the acid, and makes an alkaline solution, which is not irritating, and if the solution is used immediately, after the addition of the soda, the peroxide remains effective. This solution causes a disintegration of the mass, and an ordinary soap suds enema following it, is effective, where it otherwise would fail. This disintegrating enema can be given every two hours, and after a few injections the impactions break down and can be removed. It is the simplest method of breaking up these rectal impactions of old age.

Many old patients, especially women, suffer from large amounts of gas, and air in the bowels. This may be due to several causes. The attacks of gas may be one of the symptoms accompanying diseases of the coronary vessels, and coming on in attacks either with distension of the

stomach, or the bowel, form a very pronounced symptom in coronary disease, and are not usually attributed to their cause. The treatment of this should, of course, be directed to the vascular disturbance of the heart; *nux vomica*, or alcohol with meals will often assist the digestion in these cases, but of this we will speak later.

Another cause of intestinal distension is intestinal fermentation, then the lactic acid bacilli, or *Acidophilus bacilli* regime in milk, or in tablet form, when milk is not well borne, will often diminish the cause. If, however, this seems to fail, the capsules recommended by the late Dr. Delafield, containing 5 minims of castor oil, and 5 grains of salol, will often stop the intestinal fermentation, and diminish enormously the gases contained in the intestine. Some elderly women suffer greatly from gas, which is not relieved by any of these procedures. The pills recommended by Dr. John Rogers, made from the interstitial cells of the ovaries, will often in these patients, prove efficacious. Experiments show this form of ovarian extract produces an increase of pituitary excretion in the spinal fluid of animals. This inter-relationship produces an increased tonic condition of the intestines in which the gas does not form. If these so-called glystital pills are given, they often produce a relief from the very troublesome and annoying condition in these elderly patients.

However advantageous the climate of a temperate zone may be to stimulate the young, and those in the vigorous years of life, its various changes and chills in winter are prone to produce a bronchitis in the aged, with or without its accompanying dangers of pneumonia. Often the beginning dry, hacking cough of an acute infection of the trachea and bronchi can be much relieved in the aged by stimulating the bronchial secretions. For this purpose small doses of one or two drops of the wine of ipecac, and the wine of antimony with $\frac{1}{2}$ grain each of iodide of potash and ammonium chloride to the teaspoonful of water, given every 2 hours, are a very effective medicine to relieve this situation; larger doses of these medicines are prone to

nauseate, but the small doses increase the secretions, and give relief.

After a bronchitis has become established, the disinfection of the bronchii through the excretion of substances in the lungs, is often an effective method of treatment, and some form of creosote, as the carbonate of creosote, or some form of guaiacol, is a very effective procedure. A dram of the carbonate of creosote in 4 ounces of water with $\frac{1}{2}$ dram of gum of acacia makes a very simple emulsion, and gives $2\frac{1}{2}$ drops to the teaspoonful. You see I am arguing here that a teaspoonful and a dram are not equivalent, and if one chooses to measure a teaspoonful, one finds that there are 6 to an ounce, and not 8, as there are drams, and a teaspoon contains 85 drops, and not 60. This argument is settled by actual measurement; measure the teaspoonful, and anyone will be convinced of the accuracy of the statement.

Codein is much used in coughs to stop the coughing, and in elderly people small doses such as $\frac{1}{15}$ th, or $\frac{1}{25}$ th of a grain are much more effective given every 10 to 15 minutes, for a few doses, mixed with cubeb and the extract of licorice. This method of giving it will stop the coughing at night that is so troublesome, and is much better than giving the doses of $\frac{1}{4}$ and $\frac{1}{2}$ grains of codein which seems to be the method usually used, judging from the prescriptions of my hospital interns coming from many medical schools.

The current infections of bronchitis, or colds, and influenza that are prevalent in city life, bring with them the danger of the acute involvement of the myocardium, and often in the aged bronchitis persists, because there is with it this failure of the pulmonary circulation. When once this is realized, the attention to and treatment of the circulation clears up the bronchitis.

Often in old age in the recovery from these exhaustive intercurrent infections of bronchitis, and of influenza, it is of great benefit to give these patients alcohol with their

food, either with their meals, or with extra food between meals. This is specially true in the cases that show the cardiac involvement, or in those in which the nervous exhaustion following influenza is present in a more than average degree. In many aged people the dangers from the infection of bronchitis can be diminished by prophylactic injections of mixed vaccines, given in the early fall, once a week for 5 or 6 doses, giving 3 or 5 minims of a vacciné in which 1 M bacteria is contained in 1 c.c., and in 5 days repeat the injection, increasing each time 2 or 3 minims until at the last dose the patient is taking 12 or 15 minims.

Pneumonia in the aged is a terminal infection in many individuals, and it is always a serious condition in any person over 50, although 50 is not the period that one should designate as of old age.

The therapeutics, however, of this condition will be definitely dealt with by another confrere. I can but record by own experience for what value it may possess, that of late years, I have found a distinct benefit in using vaccines in pneumonia, and in some 500 patients thus treated in those who were 50 years of age, the death rate in the treated patients was 33%, while in the controls it was 59%, and for further treatment the circulatory collapses have been best met by adrenalin, giving 10 minims every hour for 6 to 8 doses as the situation demanded.

Although my opinion differs from many of my confreres, I frankly admit that in my hands, and among my patients, alcohol has proved to be a broken reed on which to lean in pneumonia of the young or old, during the acute stages of the pneumonia. In an exhausting convalescence, after any disease, and in cardiac conditions of the aged, as we will discuss later, alcohol is distinctly of benefit, but in the acute stages of pneumonia it has been more of a detriment than a benefit to my patients.

Thewlis in his excellent book on Geriatrics emphasizes the manifold diagnostic enigmas which chronic uremia

and intestinal intoxication produce in old people. The irascibility, the lack of co-operation, the unmanageable difficulties of getting along with old people, are often due to their unfortunate inability to rid themselves of their decomposition products, whether their diet may be right or excessive, or whether their intestinal tract may remain over loaded, and improperly cared for, or whether with increasing chronic nephritis they may be unable to excrete the detritus that has formed in their every day existence. The skin of the aged is hard to make perspire, and they are therefore diminished in their ability to rid themselves of their detritus through this emunctory. For that reason, an abundance of water to flush out their kidneys, and the necessity of purging them with something more than is their habitual amount, is often a necessity, and their symptoms diminish when this is done. Often much of the pains in their joints and muscles, and their headaches, and often their dizziness come from this same lack of proper excretion.

I have left until the last the most important discussion of all, for on it depends the continuation of the existence of old age, that is of the heart and circulation, for one cannot speak of pharmacology in the aged, and leave this subject untouched. Many of the processes of old age are due to a hypothyroidism, and also to the diminution of the secretion of the adrenals. Iodides and iodine stimulate the thyroid, and the general nutrition of the body is greatly increased through a thyroidal stimulation. The thyroid acts alike on circulation and kidney function, improving them in many instances, so that in considering any discussion of circulatory improvement, and in the prevention of the steadily increasing circulatory degeneration of old age, one must take this form of medication into account, and it seems to be increasingly evident that the judicious use and interplay of iodine on the thyroid, with the use of adrenal medication will help much in the retardation of circulatory degenerative processes in old age. Excessive high tension from spasm of the arterioles is not normal for old age, and the layman's idea that his blood pressure

should be his age, plus 100, does not hold good. To control the systolic pressure if one must, attention to the intestinal putrefactions does much to relieve this symptom, and of these medications we have already spoken. If necessary for emergencies, one can control the hypertension through nitrites, and in many instances, with small doses of chloral, and in emergencies of cardiac conditions, the aged bear well chloral and the tinctures of opium. The two drugs that will make an impression on the diastolic pressure are chloral and aconite, i.e. chloral in 3 grain doses, tincture of aconite in 3 to 5 drops every 3 to 4 hours, but neither of these should be continued over long periods of time, and high diastolic pressure points distinctly to a nephritic involvement. In studying the effects of intestinal fermentation, or of the hypothyroidism with spasm of the arterioles, it is the systolic pressure which is raised, rather than the diastolic, and when the diastolic is above 120 the reflexes from the kidney are the usual cause.

Old custom and traditions have taught us to look at the heart and circulation as if separate from the individual, as if to be treated as something apart, forgetting that the injuries to the circulation from the ills and diseases affecting the rest of the body, really produce the degenerations and infections which cripple the heart and circulation, or end the life of the aged. As the processes of senescence come on, the diseases of the heart are more vascular and myocardial than valvular, hence aortitis and coronary disease with the anginal pain, are more frequent in senescence than in old age. But in old age acute myocardial degeneration from intercurrent infections is an ever present danger, and from the danger of a coronary thrombosis an aged person is never free. Many non valvular diseases of the heart show no evidence of their presence to the stethoscope, and one must be willing to accept the evidence of reflex nature that does not seem to be related to the heart, and yet arises therefrom. Coronary disease often is expressed in the form of so-called gastric or intestinal dyspepsia, with which the patients feel not only an epigastric sense of discomfort, but even pain. Sometimes there is a sensa-

tion of fullness, causing a slight dyspnœa. On exertion the dyspepsia increases, and the dyspnœa is ascribed to some asthmatic peculiarity, or simply because the pain is located in the wrist, or in the epigastrium, and around the ribs it is not believed to be cardiac.

Many of the pains of alleged rheumatism are really the beginning of anginal pain. Statistics actually show that the pains of coronary disease are over twice as commonly present in the epigastrium, as radiating down the arms, or in the chest. There is a real danger to many a patient in the presence of epigastric discomfort and a so-called dyspepsia, or with the general weariness and fatigue brought on too easily from the ordinary duties of life. Exercise and golf are not the best remedies, as exercise seems at times to hasten the occurrence of the thrombosis.

In these coronary diseases of the heart, the small doses of adrenalin, or of the adrenal gland produce improvement. The iodides also here have long been acknowledged to be of use, not necessarily the potassium iodide, if it disturbs the stomach, but some form of iodine in non disturbing form. In the old days Lugol's tincture used to be given in 3-to-5-drop doses, colloid iodine to-day is an excellent remedy in 3-to-5-grain doses, once or twice a day. There is a remedy prepared here, called adrenal residue, which contains small doses of adrenalin, this either in the powder or pill form as prepared now, or in the 10 per cent. solution in doses of 10 to 20 drops relieves the coronary pain, relieves the dyspepsia, and improves the cardiac circulation by dilating the coronaries. Ansep has shown conclusively that the coronary circulation is improved and increased by adrenalin. This same adrenal residue will also help control the pain of the definite anginal attacks.

Caffein, on the other hand, while it does increase the coronary circulation, and does increase the power of the systole, shortening it, and strengthening it, poisons in some way the myocardium, and is one of the most frequent causes of extra systoles, and of paroxysmal attacks of either fibrillation or extra systoles. I not only refer to

caffein here as a drug, but also to it as the strong, pleasant beverage that most of humanity depends on for its stimulation and daily cheerfulness, but of which old age must sorrowfully and reluctantly diminish the amount which it can enjoy.

The interesting and invaluable cardiac statistics brought out by Drs. Cohn and Wyckoff, show that humanity comes to dispensaries and hospitals complaining with increasing frequency of diseases of the heart, up to the age of about 65, and then, although the mortality from cardiac diseases goes on increasing in later years as old age goes on, oddly enough neither in clinic nor hospital do these patients come in complaining of their hearts.

There has been an increasing realization among the profession, as emphasized by Dr. Reilly of this city and others, that these patients appear in hospitals and clinics, and noticeably in private practice for the care of intercurrent infections, as colds, bronchitis, etc., diarrhea, colitis, whatever it may be, but the acute myocardial degeneration brought on by the infection, added to their chronic myocardial degeneration, is the infection from which occurs the break down of the circulatory equilibrium, and the patient coming in for intercurrent disease, really dies a cardiac death. Here again the pharmacology of the aged cardiac is that of the careful attention to and treatment of seemingly unimportant intercurrent diseases of old age; they are of great danger to the aged myocardiums, and the earlier the treatment begins, the more likely may one save the myocardium from an acute injury which may be fatal. In the chronic cardiac conditions of old age there is no question but that alcohol in its daily use relieves spasms in arterioles, and improves the capillary circulation, and thus the equilibrium of the circulation as a whole; alcohol improves digestion when taken in small amounts, and is a remedy of great value in the cardiac conditions of the aged. One is not forced to use it only in forms of whiskey, brandy, or the time honored beverages in which we are accustomed to think of it, alcohol acts as alcohol as long as

it is present in any solution, and pure 95 per cent. alcohol is easily added to some bitter tonic as simple bitters of gentian with Calasaya, and can be given after meals, and will be just as effective as if it had been written out on a special blank with the special procedures at present in vogue.

In treating the chronic myocardial degenerations, the question of the use of digitalis is sure to arise. As it was pointed out long ago by Balfour, small doses of digitalis will act as a tonic in these cardiac conditions, it is not necessary to digitalize your patient to the limit of what that patient can stand. It is extremely interesting to note the difference in the patients, that a few drops of the ordinary tincture of digitalis will make; I have seen patients who improved on and took readily, and with great benefit 5 minims of digitalis 3 times a day, but in whom 7 minims, 3 times a day were too much, and smaller doses than 5 minims were insufficient to maintain a good equilibrium. Often a few drops of the tincture of digitalis given once a day, or every other day, may be sufficient, but small doses of digitalis in many of these aging hearts is of great tonic value. Added to that, the tincture of nux vomica given to patients who have senescent hearts, or who suffer from angina, will often improve their circulation, and their digestion. More than this in the pharmacology of cardiac diseases I must refer to my confreres, for I have already trespassed on their domain.

Mere pharmacology is not interesting unless it be connected with a definite clinical subject, and to other papers I must refer the rest. For example in old men we are certain to be faced with the problems of prostatic care, but that has become such a speciality that I have not touched upon it. Often the mere management of the aged is better than all the drugs you can obtain, and patience, and the willingness to listen to the many ailments of the aged who feel neglected, and are unhappy, is often of more value than any remedy. In the care of the aged also, one must be careful not to treat them too vigorously with med-

ication, nor on the other hand push them into bed ridden invalidism. Weary youth and middle age improve in bed, but as Thowlis emphasizes, old age further degenerates in bed, and should be allowed, or even be made to rise from it as much as possible.

There is no question, however, that to the aged cardiac, and to old men in general, the French dictum holds true, that the greatest dangers to an old man are too good a cook, and too young a wife, and no truer words were ever spoken, but that is not pharmacology.

ALCOHOL AND OLD AGE ¹

SAMUEL W. LAMBERT

President, The New York Academy of Medicine

Sound wine revives in Age the heart of youth,
While poor wine acts the other way, forsooth.
Pure wine on all refreshment will bestow,
In brain and stomach cause a cheerful glow,
And stagnant currents force anew to flow.
'Twill all depressing, carking gloom remove,
Sharpen the mind and also sight improve;
Quicken the ear and the whole body nourish,
And cause old age with youthful bloom to flourish.

—*Regimen Sanitatis Salernitanum.*

The physiology of alcohol has been proved in the laboratory. It is a sedative to reflex irritability: it is a dilator of the peripheral blood vessels and in this way it can relieve strain on the muscle of the heart and improve the circulation although it is not a direct cardiac stimulant. It is also a depressant to the central nervous system for it permits rest and sleep and relieves thereby the sense of discomfort and restlessness due to the discomforts of disease. It stimulates the secretions of the salivary glands and the gastric juice, it improves the peristaltic action of

¹ Delivered October 4, 1928.

the stomach and upper intestine, and thereby especially improves digestion. It is a food ready for oxidation that requires no further change to be available although it cannot be stored up in the body for future use as can other foods. It must be oxidized at once in the tissues or it will be excreted as taken into the body. Its caloric value as a food is high ranking bulk for bulk second to the fats. One gram of protein or carbohydrate is equivalent to four calories; one gram of alcohol to seven; and a gram of fat to nearly nine calories. An ounce of alcohol represents 217 calories and the investigation of Mellanby shows that a healthy person can oxidize under the most favorable conditions of laboratory experiment some four ounces of alcohol a day without causing any symptoms of intoxication. This is equivalent to 868 calories. In practice, however, half of this or about 425 calories can be easily taken by a healthy man under the ordinary methods of eating. This will supply about one fifth of the energy necessary to a man weighing 150 pounds. Alcohol is absorbed rapidly, it is excreted by the lungs and kidneys in about 2 per cent. of the amount taken in ordinary medicinal dosage. Even when taken in excess never more than 10 per cent. of the amount taken can be excreted before complete oxidation has been finished.

In febrile diseases alcohol in view of the physiological actions just enumerated relieves thirst and moistens the dry tongue and lips. It protects tissue waste in all patients who are not able to digest and metabolize the ordinary proteins, carbohydrates, and fats of their regular food in sufficient quantity to supply the normal demands of their body activities. In the aged and in sufferers from chronic diseases, alcohol is an appetizer and helps to digest other food. In severe cases of those in the last stages of cancer, and in the cachexias of other chronic ailments which present in an exaggerated degree the condition of pathological physiology characteristic of old age, alcohol is often the only food which the diseased stomach can retain and absorb. Alcohol in the form of malted liquors such as beer and stout is a stimulating tonic and frequently

is the least harmful of all soporifics for the neurasthenic and nervous patient. Fermented liquors form a most useful tonic and food in convalescence from prolonged infections and from severe surgical procedures. Alcohol is not a direct heart stimulant, but indirectly by its action on the peripheral vessels and directly as an antidote to the chronic poisoning of the heart from overindulgence in coffee and tobacco, much is gained in the treatment of man which is not discoverable in the laboratory of the pharmacologist. Alcohol by its rapid absorption without the necessity of previous digestion, by its action to increase the amount of blood circulating in the capillaries of the skin which have been dilated by its use, gives a feeling of distinct warmth and comfort to the aged. By its similar action on the blood vessels of the brain alcohol in moderation quickens the cerebral activity and gives the imagination a freer play, while it inhibits the higher functions of the intellect and also checks the excessive activity of the logical faculty. It furnishes a quickly oxidizable food and relieves fatigue after exertion of mind or body more quickly than any other food. It reduces the tendency to brood over the inevitable accumulation of years beyond three score and ten. The individual feels less despondent and is able to endure the lessened activities of the mind and the inertia of his aging tissues with a greater equanimity.

I hasten to deny that I am advocating drunkenness for anyone although I may be accused of it. The claim that alcohol is toxic in all doses is put forward as a strong plea for the intemperance of teetotal abstinence. This is absurd for the normal brain gives a reaction in persons who have taken no alcohol exactly the same as the brains of the man dead of acute alcoholism. The amounts found in teetotalers are so small that it is not quite certain whether the reaction is due to true grain alcohol or to some allied chemical substance. The inference that normal metabolism forms alcohol and uses the same in the combustion of food products is a fairly accurate one although the difficulties of absolute proof have not yet

been successfully overcome. Dr. Gettler of the Laboratory of the Medical Examiner's Office in New York is at work on this problem, but has not as yet been able to offer more than a probable answer to this question. It is Dr. Gettler's professional duty to analyze the bodies and especially the brains of all persons who are certified as dead of alcoholism and of those in whose case alcoholism is recorded as a complicating condition of their death.

The physiology of old age represents as compared with that of the healthy adult individual a slowing down of all the processes of life. Mental activity is less active, digestion is slower and hampered by a diminished secretion of gastric and other digestive juices, muscular activity is weakened and excretion is diminished. This picture cannot be measured in years. Some people grow old between the ages of 50 and 60, others do not grow old until after they are 80 years of age. The gradual fibroid changes in the heart muscle and in the blood vessels is the most prominent factor which brings about the physical changes in the cells of the glandular organs which have to do with the chemistry and metabolic processes of life. In discussing the action of alcoholic beverages upon the human organism in the processes of increasing senescence, the greatest emphasis must be placed upon the effect on the circulation, on the digestion, and on the chemical processes going on in the muscles. It is customary to refer to the action of this group of food products entirely in terms of their alcoholic content, and the subject given to me to discuss is "Alcohol and Old Age." It is almost never that pure grain alcohol mixed with varying amounts of water is given for internal medication to any human being. The reverse is true when one considers the result of laboratory experiments which are conducted with grain alcohol only. Wines are never wasted upon the rabbits and guineapigs of the laboratory, and the action of wines and beers and also of well-aged liquors are something more than that of mere diluted alcohol. The wines in particular contain other derivatives from the result of fermentation which can neither be quan-

titatively analyzed nor duplicated in synthetic manufacture. Alcohol and water is a disagreeable drink in any dilution. Whiskey or brandy mixed with water is quite the reverse to most palates, and the wines are the most agreeable of all. The action of a well-flavored wine which may contain anywhere from 8 to 15 per cent. of alcohol is felt by one partaking of it as soon as the beverage is taken into the mouth. Its agreeable aromas stimulate appetite and increase the secretion of the salivary glands. Its action on the stomach is similar. It causes an increased flow of blood to the stomach wall and increased secretion of gastric juice, and does so to some degree whether the previous secretion from the stomach was normal or lacking in the digestive ferment and a normal amount of hydrochloric acid. The taking of wine with a meal therefore increases the desire for food and improves the nutrition. The wine itself requires no further digestion and is almost the only food product which will be absorbed from the stomach itself without further preparation or delay in its reaching the capillaries of the tissues. After absorption by the blood vessels it is carried to every part of the body without detention in its passage through the liver. Arrived in the glandular and muscular tissues most of it is immediately oxidized supplying energy and in so far as it is oxidized, protecting and conserving the other sources of energy supplied by fats, carbohydrates and proteins of food. If the tissues are supplied with more alcohol than can be immediately used it passes through into the veins and a certain amount is excreted by the kidneys and lungs and thereby removed from the body. The remainder is held in the cell itself for short periods of time prior to further oxidation and the production of energy or its excretion later. Dr. Gettler in his analysis of brain placed the amount of alcohol present in the brain without any pathological symptoms as varying from $2/100$ to $1/10$ per cent., that anything over this amount would begin to give cerebral symptoms, that the beginning of intoxication and loss of equilibrium in walking began at one quarter of one per cent., and that a dangerous point of poisoning was

reached at over $4/10$ of one per cent. It has been shown that a healthy man can digest and oxidize from seven to ten cubic centimeters of absolute alcohol per hour without poisoning symptoms or any signs of intoxication. This means that a healthy man can handle in the neighborhood of ten ounces of whiskey during sixteen hours during which he is awake but that in order to do so it must be taken in evenly distributed dosage through the whole day. Of course, such a use of a beverage is impossible and it has been found that this theoretical four and a half ounces of absolute alcohol is too much if taken in the ordinary manner of use of beverages and food. Half this amount or two ounces of absolute alcohol which is equivalent to about four ounces of whiskey or to a pint of wine of 12 per cent. strength represents the maximum that a healthy person can absorb and oxidize. This maximum measure in whiskey would represent about two and a half pints as the maximum quota for a healthy man in ten days. When applied to old age there is a very great difference in the individual capacity to oxidize alcoholic beverages just as there is a difference in the capacity of younger persons to convert this form of food into energy by metabolic combustion. It is most exceptional that any person over 60 years of age cannot handle with advantage to his digestion and to his nutrition some quantity of a good sherry, port or claret during the twenty-four hours. The form of beverage which shall be used is entirely one of individual peculiarity depending partly on taste and partly on the physiology of the body.

As compared with wine and distilled liquors the question of the use of malted beverages should be considered. Beer is distinctly nutritious entirely apart from its alcoholic content which averages about 4 per cent. Beer is distinctly sedative and hypnotic apart from its alcoholic content because it contains an extract of hops. If the individual is suffering from certain diseases such as an active inflammation of the kidney alcoholic beverages may possibly prove harmful. If the individual is a victim of true gout certain beverages may increase that ten-

dency and bring on a pathological condition. Certain other beverages on the other hand may prove a benefit in the elimination of acute poisons. George Saintsbury Regius Professor of English at Cambridge University wrote some years ago an account of the wines that he had owned and had enjoyed. He called his little volume "My Cellar Book." He wrote it at the time that his cellar was empty and it was empty because with advancing years he had proved to himself and to his physician that he could no longer enjoy these beverages. In that book he sums up the whole situation of the use of alcohol as an addition to the foods in the diet of every day. He says if a man can not drink without harm to himself he is a fool if he does so, but that if he can enjoy wine he is a bigger fool if he does not.

When it comes to the treatment of the circulation itself, to influencing the hardening arteries of the general system and particularly the coronary arteries, the use of alcohol in old age has a very specific value. It is a dilator of the peripheral blood vessels. The quick energy which it furnishes to muscle is shared in by the muscle of the heart and there is no question but that a little wine "for the stomach's sake" represents a real therapeutic result and is an action not on the stomach but on its nearest neighbor, the heart. The thickening arteries of old age result in the much advertised and talked of condition of high blood pressure. High blood pressure in itself is not a serious symptom. It only becomes of importance when the greater obstruction to the passage of the blood from the large arteries to the tissues of the body is no longer overcome by an efficient and sufficiently powerful action of the heart. The use of alcohol equalizes such a circulation by giving extra and rapidly usable energy to the heart muscle and by dilating the blood vessels to reduce the peripheral obstruction and lessen the demand for power on the heart itself. The pharmacologists insist that alcohol is a depressant of the higher nervous centers and it is probable that such a depression of overexcited mental activity is a great help in relieving nervous anxieties which

become exaggerated in old age as a result of worries and family jars and differences of opinion which may be more imaginary than real but which nevertheless are a cause of many symptoms of a physical nature. Several of the group of symptoms known to the laity as a skipping or thumping heart which are due to extrasystoles probably dependent on myocardial lesions of slight pathological significance are helped by the use of a dose of some alcoholic beverage taken regularly with meals. The symptom of palpitation also can be benefitted in many instances whether due to organic change in the myocardium or to emotional cause. These arrhythmias in the aged are more alarming to the patient than of real serious nature but their control or removal is of real therapeutic value in making these patients more comfortable and more able to lead useful lives.

But it is when we come to that severe symptom complex known as angina pectoris that the use of alcohol is of the greatest value. The anginas which depend upon a true lesion of the myocardium are benefitted by the sense of well-being which alcohol induces, by the relief of the anxiety and pain of the attack itself as well as of the worry and apprehension of the interval between the attacks, but there is no doubt that the use of brandy and the stronger alcoholics has a very distinct effect to restore an equalized circulation by removing the disturbances which usually accompany angina pectoris. Other drugs such as the nitrites and stronger dilators, the analgesics including morphine are not contra-indicated during the use of alcoholic beverages. The effects of the other poisons which are habitually used by man as part of his daily life are not as useful to him in his old age as is the much abused alcohol which is now under the ban of the reformer and the taboo of the Constitution. Tobacco is a help to many. Its effect makes for an improved enjoyment of life. Tobacco, however, in cases of increasing myocarditis can easily prove a potent cause of anginal attacks. Coffee and tea may frequently be the exciting element which brings on extrasystoles and the cardiac arrhythmias. In these cases the

use of alcohol will benefit and may remove the symptoms possibly only with a needed reduction in the daily consumption of tobacco or coffee, and not their entire elimination. One of the effects of prohibition with its elimination of a rapidly oxidizable food in the daily life of the American public has been a marked tendency of everyone to turn to the next easily oxidizable food that is available, and since prohibition the consumption of sugar in the United States has increased tremendously. As a result the strain on the pancreatic function has been markedly increased and diabetes has become a more prevalent disease. This is shown by the death rate from diabetes which in spite of the discovery of insulin by Banting is still increasing. Diabetes is not a prominent disease in the aged although there are many cases which develop as age advances, but it is particularly true in the diabetes of old age that alcohol has a useful and prominent place in the treatment of the disease. A recent writer ascribed the increase in diabetes as being due not to the influence of prohibition but to the increase of fat Jewesses in the Land, but in my opinion it is more a question of the toxicity of the increased sugar intake by the whole population than a problem of race or of sex.

Alcohol as a beverage presents an entirely different problem from alcohol as a drug, but it must never be forgotten that it is only in beverage form that alcohol can be used as a drug. A United States District Attorney recently wrote in his brief upholding the law prohibiting physicians from using their own judgement as to the amount and kind of alcoholic beverage which should be prescribed in the treatment of disease that physicians had no cause to complain, that if they wished to give such a medicine to their patients the law would permit them to use pure grain alcohol so medicated as to be unfit for beverage purposes, that they could use without limit any of the patent medicines which are sold freely in the market, that they could send their patients to a hospital where unlimited quantities of alcoholic beverages were permitted as a drug although the hospitals thus excepted by law are those es-

pecially chartered for the cure of alcoholism, or he may use any preparation of the pharmacopeia which contain a sufficient quantity of alcohol. It is a great therapeutic suggestion that physicians should turn to Tomah Joe's Medicine or to Saphronia Ely's Remedy for their prescribing of a useful and necessary medicinal agent. It is impossible to argue on this subject with a reformer who has turned his attention from the control of the alcoholic problem and the saloon to the compelling of total abstinence on everyone, the invalid as well as the drunkard. Everyone agrees that the saloon is bad, but nearly everyone is now convinced that the speakeasy is worse, and in fact it is impossible to get upon a common ground for discussion. The reformer thinks only of drunkenness and debauchery, and the physician thinks only in terms of moderation, temperance and medicinal values for the normal person and of inebriety and excess as a pathological condition of mind.

In the referendum conducted by the American Medical Association in 1920 answers were received from some sixteen thousand physicians who were asked whether whiskey, beer and wine were necessary to the practice of medicine. The referendum was worded not with reference to the usefulness of alcoholic beverages, but the extreme question was put as to the necessity of these drugs. A majority of the physicians recorded their answers that whiskey was a necessity, that wine and beer were not. It cannot be denied that all three are useful and yet nevertheless so high an authority as the Supreme Court of the United States has based its decision on the assumption that it is a fact that beer has no medicinal value which is not possessed by whiskey, and that a pint of whiskey every ten days is a reasonable amount to permit for the medicinal use of one patient. This permits to a single patient an ounce and a half per day. So far at least as the aged are concerned, to say nothing of the usefulness of alcohol in acute infectious and febrile diseases, a pint in ten days barely permits half of the desirable quantity that may be used with advantage. An effort was made in this City to establish the unconstitutionality of this part of the Volstead

Law. This effort in the Courts has failed and if the medical profession is to re-establish its right to prescribe what drugs it will in what doses it deems sufficient it must do so by a concerted effort led through its great organization to wring from Congress a proper, logical, and just law and to relieve itself from the public stigma now placed upon it of being bootleggers and panderers to human frailty and intemperance.

It is quite customary in this Country to accept the decisions of the Supreme Court as final and without question. In the case of the decision rendered by a vote of 5 to 4 justifying the legislation embraced in the Volstead Act it is interesting at least to look more intimately at the opinions rendered by the majority and minority of the Court. Mr. Justice Brandeis representing the majority of the Court gave the following reasons to justify the enactment of the prohibitions of the Volstead Act: "The Court further held that Congress must be regarded as having concluded—as it well might do in the absence of any consensus of opinion among physicians and in the presence of the absolute prohibition in many of the States—that malt liquor has no substantial medicinal qualities making its prescription necessary; and that this made it impossible to say the provision was an unreasonable and arbitrary exercise of power.

"We have spoken of that case at length because the decision was by a unanimous court and if adhered to disposes of the present case. If Congress may prohibit the manufacture and sale of intoxicating malt liquor for medicinal purposes by way of enforcing the Eighteenth Amendment, it equally and to the same end may restrict the prescription of other intoxicating liquor for medicinal purposes. In point of power there is no difference; if in point of expediency there is a difference, that is a matter which Congress alone may consider. Experience has shown that opportunities for doing what the Constitution forbids are present in both instances, and that advantage not infrequently is taken of these opportunities. Congress, in deference to the belief of a fraction of the medical

profession that vinous and spirituous liquors have some medicinal value, has said that they may be prescribed in limited quantities according to stated regulations, but it also has said that they shall not be prescribed in larger quantities, nor without conforming to the regulations, because this would be attended with too much risk of the diversion of the liquor to beverage uses. Not only so, but the limitation as to quantity must be taken as embodying an implicit congressional finding that such liquors have no such medicinal value as gives rise to a need for larger or more frequent prescriptions. Such a finding in the presence of the well-known diverging opinions of physicians, cannot be regarded as arbitrary or without a reasonable basis. On the whole, therefore, we think it plain that the restrictions imposed are admissible measures for enforcing the prohibition ordained by the Eighteenth Amendment."

It is practically said that the physicians differ in opinion and the medicinal liquor may be diverted to beverage purposes, and that an implied finding by Congress is sufficient ground on which to base the constitutionality of a law. The best answer is found in the minority opinion written by Mr. Justice Sutherland as follows: "It is said that high medical authority is in conflict as to the medicinal value of spirituous and vinous liquors and (hence it would be strange if Congress lacked power to determine that the necessities of the liquor problem require a reasonable limitation of the permissible prescriptions. This observation does more than beg the question—it indulges an assumption the exact contrary of that which the record conclusively establishes, for the limitation of quantity is not only unsupported by any legislative finding that it is reasonable, but it is in flat opposition to the only facts appearing in the record which bear upon the question of what is a permissible prescription and, therefore, is without rational basis, resting alone upon the arbitrarily exercised will of Congress. I do not see how it can be held otherwise without completely ignoring the case as made and constructing and considering another and different case.

"Nor is the opinion of the majority aided by the long list of state enactments cited to demonstrate that the present statute is not arbitrary, for, since the control of the medical practice is outside the province of the federal government and wholly within that of the States, *Linder v. United States, supra*, the powers of Congress in that field are not to be assimilated to those of the states.".... "I do not doubt the authority of Congress to regulate the disposal of intoxicating liquors for medicinal use so as to prevent evasions of the law against the traffic in such liquors for beverage purposes, and to that end to surround the prescription by the physician with every appropriate safeguard against fraud and imposition, but as this record now stands it cannot prohibit the legitimate prescription of spirituous and vinous liquors for medicine as this statute attempts to do. "Federal power is delegated, and its prescribed limits must not be transcended even though the end seem desirable." *Linder v. United States, supra*, p.22. Because this statute by fixing inadequate prescriptions prohibits to the extent of such inadequacies the legitimate prescription of spirituous and vinous liquors for medicinal purposes, it exceeds the powers of Congress, invades those exclusively reserved to the States, and is not appropriate legislation to enforce the Eighteenth Amendment. The decree below should be reversed."

An individual case under the Volstead Act is being enacted at the present time in this City. A well-known physician has had a book for the prescribing of alcohol prescriptions ever since they were required. It has been his custom to enter on the spaces of that book that the medicine is ordered for "medicinal purposes," or "medicinal," and he has refrained from placing on record the name of the disease from which his patient suffered. His book having run out in July it was ten weeks before he could have it renewed because he refused to disclose the names of the diseases for which his patients required the medicine whiskey. After a rather sharp correspondence his contention was supported and the book was issued. This experience has occurred to him periodically every time a new book

was requested. Since the issuing of the book inspectors have called at his office and have demanded to see his records in order that they may know for what diseases he is prescribing. The physician has refused to show them his book on the ground that although the law requires that the alcoholic beverage should be prescribed only for some known disease it is not the business of the Government to be informed concerning the private affairs of the patient and that the physician is required and privileged not to divulge such affairs personal to anyone except for the detection of crime and conviction therefor. It would be a wise thing if more physicians should take a decided stand in this matter and get relief from the exasperating and inquisitorial methods. A paternalistic and imperialistic government method should be checked now before worse and more stringent endeavors to pry into personal affairs between the physician and the patient should be put in force. Organized medicine has been reluctant in coming forward to influence Congress for the passing of proper laws. The Courts have decided that the present situation is constitutional and that relief must be had from Congress, and I personally hope to see a more active campaign for relief coming from the profession as a whole. It is no longer fit that physicians should carry this important question personally to the courts of law in order to protect themselves and their patients in their rights.

I shall close with an opinion of alcoholic beverages of some 250 years ago. In one of the books concerning old age "*Via Recta ad Vitam Longam*," published in 1660 and now on exhibition in the library, Tobias Venner of Bath, England, wrote in praise of whiskey as follows: "Usquebath is a kinde of *Aqua vitae*, and in Ireland of great use, which in regard of the moistnesse of the aire and Country, is very proper and healthfull for the Inhabitants: for it notably strengtheneth the stomack for concoction, discusseth winde, concocteth and dissolveth crude and flatulent humors, causeth phlegme to be expectorated, reviveth the spirits, expelleth melancholy, and mightily fortifieth the whole habit of the body, being taken the quan-

tity of a spoonfull or two after meals, or at any other time when the stomach shall be ill affected.

“Although Usquebath, be of little use with us, yet in the Winter season, or any other cold and moist time, the moderate and orderly use thereof may be of great consequence for supporting a vigorous state of body: for if it be well made, you shall scarcely meet with a more strengthening and cordiall liquor; but it is most convenient for the aged, and for them that are of a cold and moist constitution of body, and in the cold seasons of the year.”

THE AGING OF THE HUMAN BRAIN ¹

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In discussing such a subject as the Aging of the Brain, certain limitations should be made clear at the outset. In the first place, there are some illusive aspects to this problem concerning which one opinion may appear as valid as another. In the second place, the material at present available for a complete and satisfactory solution of the question is insufficient in amount and otherwise inadequate. And finally, no authoritative statement in the matter at this time seems possible from the evidence in hand:

What I shall have to say expresses a personal point of view, an interpretation and application of the facts as I see them. You may differ with my opinion totally or in part, which is as it should be in such a debatable and open question.

When this subject was proposed, my first reaction was one of hesitation and considerable resistance. My own interests have been on the other side of the ledger. Problems concerning the growth and development of the brain, its further utilization in behalf of more adequate human adjustments, have made a strong appeal to me. I am not

¹ Delivered October 9, 1928.

especially attracted by the question of the brain's decline and decay. This stage savors too much of cheerless finalities in the autopsy room, of futile and fading days of life in the homes for the aged and infirm.

Then I asked myself the questions: Who has ever seen a strictly old brain? What does it look like? When does it first begin to show the signs of age and why does it grow old? Thus far I have not found the answers. In fact, old age itself in many ways appears to be an institution of human making. It is not recognized in the natural world about us. Here the race is and always has been to the strong, the vigorous, the alert, the competent, regardless of age. To falter is to invite destruction; to weaken and fall is to die. In the wild, animals enfeebled by injury, disease or age are shown no quarter. Beast, bird and reptile, each has its natural enemy, never far distant and always ready to take advantage of failing power. Sudden destruction, awaiting all alike, saves them from gradually waning vitality, from progressive disease, from a long and tedious process of death. Nature's mercy works swiftly.

Man, out of his rich endowments of sentiment, struggles earnestly to prolong deficiencies which nature prescribes, to cultivate inadequacies which nature forbids.

In the strict biological sense old age seems to be an exclusively human institution based either upon disease, upon a mental attitude, or upon both of these together. By morbid changes of the tissues, old age may claim the young long before their time, just as a buoyant and determined human spirit may resist the ravages of years long beyond the allotted three score and ten. Many human records bear proof of this valiant resistance against the mental attitude of old age. I know of no more telling instance than that of the Turkish gentleman who, as recently reported by the Associated Press, has attained the astonishing age of 154 years. This is achievement enough by itself. But in addition, he has just successfully divorced his eleventh wife in order that he might take unto himself

a twelfth.² Who would venture to assert that this much varied century and a half of human life has yet succeeded in producing an aged brain?

One difficulty in dealing with the problems of old age is our statistical ingenuity. Our time limits for the span of life are narrowly conceived. If they pragmatically justify the rule of averages, they overlook the vital significance of striking exceptions. If they actually accept old age as a corollary of life, they inconsiderately neglect certain causes underlying the process of growing old. It may not be denied that decay and death are implicit to life. On the other hand, the slow or sudden appearance of dissolution is due more to circumstance than to any fixed chronological schedule. This is surely true of the brain.

From what we now know of the causes underlying senescence, in the light of many striking exceptions, I should prefer to consider the so-called aged brain as one which has been diseased, abused or neglected. According to this point of view, mental old age has a pathological background. It arises from definite conditions which may be combatted or corrected. As it is, the senile brain already has a well established reputation. Its literary record may be less picturesque than that "Last scene of all which ends this strange eventful history sans teeth, sans eyes, sans taste, sans everything."

To common experience this time of life is known as second childhood. Psychological technique has reduced it to more exact terms, has measured it in units of failing memory, waning concentration, wavering attention with a strange tenacious dwelling upon things long past. The brain of old age has been even further labelled for identification. Certain features which stand out upon its surface have been recognized. These features with all the meaning of tell-tale crows' feet about the eyes, of deepening lines upon the face, announce that such is an old brain, and such

² *N. Y. Herald-Tribune*, Aug. 12, 1928, front page; Constantinople Associated Press.

are the structural appearance of its antiquity. In brief, this is what the brain of an old man is *said* to look like: Its surface is wrinkled and shriveled. Its wasted convolutions have a coarse appearance and feel hard. Their surface is unequal and granular. The fissures separating the convolutions are deep and gape widely. The sub-arachnoid space is filled with a large amount of fluid. The cavities of the ventricles are dilated and their walls have a granular appearance. Along these walls are calcareous incrustations, small plaques and superficial softenings. In many old brains there are partial adhesions between the ventricular walls, forming pseudomembranous bridges. Most of this marked wasting of the brain is found in the anterior two-thirds of the organ. There is much reduction in the gray matter and some also in the white.

Pierre Marie has described a condition which he calls "l'état vermoulu," or worm-eaten state. It is limited to the gray matter of the cortex, particularly in the temporal and orbital lobes. This occurs only in aged people. Madame Dejerine has recognized this state frequently in old brains and found that it rendered many of them improper for histological study.

Not only does the brain itself show these changes. Its covering, the pia mater, is thickened and infiltrated, and the walls of the blood vessels constricted or thickened.

At this juncture it is fitting to introduce the black mark of the aged brain, namely, the senile plaque. Although Alzheimer (1906) was not the first to observe these plaques of the aged, he definitely associated them with precocious senile dementia. Several years later Perusini confirmed this observation and gave to the condition known as pre-senile dementia the name of Alzheimer's disease. Fischer also studied these peculiar badges of old age. But he concluded that normal old people are quite free from those stigmata which are characteristic of senile dementia only. Fischer called them mycotique sclerosis and believed them to be due to some obscure spirochætal infection.

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Now, however, comes a categorical investigator, Simchowics, who is willing to stake all on the senile plaque as the identifying mark par excellence of the aging brain. He believes these pathological spots in the cortex are a sure sign of normal old age. The range of his investigation included brains from 75 to 104 years of age. Up to 75 years in normal people these tell-tale signs of decline were not found. This exemption strikes a most reassuring note. It produces valid evidence that old age may keep its withering touch off of the brain long beyond the proverbial three score years and ten. In aged persons after 80 years, a few senile plaques appeared. But this is not true in all octogenarian brains. After the 90th year these plaques of age were always observed. This fact seems to set the actual threshold of old age at the 90th year. The evidence from the brain, at least, points strongly in this hopeful direction. In old people after the 94th year there was a goodly number of senile plaques, while in one old gentleman of 104 they appeared in great number. Although this mycotic sclerosis appears also in various forms of senile dementia, it is the distinguishing feature of the normal old brain. The spots are said to be the lesions characteristic and typical of the senile gray matter and are more numerous than any other lesions encountered in old age. It is for this reason that Simchowics has called them senile plaques, wishing in this way to make clear that they are special attributes of the senile brain. These lesions are scattered in very old normal subjects and in senile dementia, throughout the brain, but they appear in greatest number in the frontal region. They do not occur in the cerebellum or in the spinal cord.

The number of these plaques constitutes not only a symptom of importance from the standpoint of differential diagnosis; it is also an index of the intensity of the involutonal process in the senile brain. If we admit that the number of plaques is a sort of senile index of the different regions of the brain, it may be possible to produce a senile formula of the entire cortex in question. Pursuing this idea, Simchowics has constructed a mathematical

expression which aims to give the degree of senility represented by any brain. This formula is quite different in simple, uncomplicated old age from the formula in pre-senile and senile dementia. During physiological atrophy of the brain, the plaques increase very slowly in number, for a period of 20 years or more. The reverse is true in the intensely rapid development of the atrophy in senile dementia, which takes place in a few years.

Thus it appears, from the clinical as well as from the anatomical standpoint, that senile dementia does not differ essentially from the ultimate state of normal old age except in its less rapid development. These observations mean, if they mean anything, that senile plaques are the evidence of disease in the brain not alone in senile dementia but in normal aged people of more than 90 years. The senile plaques thus speak in favor of the view that the old brain is actually a diseased brain.

This interpretation is emphasized by Leri who appears to have given the first concrete description of the senile brain. He asserted that there is no senile organ, and notably no senile brain, without definite pathological lesions. These lesions may be essentially diffuse and macroscopic. They may be microscopic, scattered and without definite focus. They consist of simple or degenerative atrophy, involving the nerve cells, proliferation of the interstitial elements, sclerotic lesions of the vessels. But all of them, whether large or small, scattered or focal, appear to depend upon an ensemble of intoxications accumulated and sustained during all of the individual's life history. These intoxications are often multiplied in advanced age in consequence of certain organic insufficiency.

The senile brain is always small and atrophied. Its weight and volume are much diminished. The atrophy is predominant in the frontal lobe. The corpus callosum is thin. The septum pellucidum is thin and transparent. The white matter in the centrum ovale and passing among the basal ganglia is reduced in size. The white matter of each individual convolution is decreased. Perivascular dilatations occur and "l'etat criblé." Even the cerebellum

may take part in this atrophy but never to the same degree as the cerebral cortex. The nerve cells upon which depend all of our higher mental activities are atrophied but not in proportion to age. Often many healthy cells remain in subjects of advanced years. Nissl's bodies begin to disappear; a mild degree of chromatolysis is present. Strongly developed lipochrome degeneration of the brain cells is characteristic in elderly people and indeed, a general tendency to an increase of intracellular pigment. Many varieties of pigment granules occur, which have usually been described under the name of yellow pigment. They seem to be derived one from another and represent successive stages in the process of degeneration. Many of these cellular alterations do not differ essentially from changes observed in consequence of prolonged intoxication, like chronic alcoholism, uremia, or lead poisoning, quite apart from old age. The nerve fibers in the aged brain are diminished in number. This is especially true of the radial fibers extending outward into the gray matter of the convolutions. The transverse fibers are equally diminished, notably the fibers of Tuzcek. This is a lesion which appears particularly in the dementias. Degeneration of myelinated fibers is apparent by simple atrophy, sometimes by abnormal coloration and rarely by the formation of granular bodies. The amyloid bodies frequently appear as the result of segmentation of various axis cylinders. The genesis of the corpora amylacea is not clearly understood. Myelinated fibers disappear and thus explain the atrophy of the white substance. The neuroglia cells in some areas appear to be increased in number, but this change is relative in consequence of the actual diminution of nerve elements. Some of the neuroglia are apparently neuronophages. The proliferation of the neuroglia fibrils determines a senile sclerosis more or less pronounced. The blood vessels almost invariably show sclerotic changes within the brain, not, however, in proportion to the atheromatous lesions of the basal arteries. The arterial lesion often involves all coats of the vessels. More rarely it is an endarteritis, a peri-arteritis or a mesarteritis. Lesions

of the capillaries are infrequent. Perivascular sclerosis is a common occurrence, particularly in those parts most poorly vascularized. Miliary hemorrhages often occur in senile brains and may be independent of miliary aneurisms. Small multiple foci of complete softening in or immediately below the senile cortex, areas of lacunary disintegration, small regions of cavitation and large areas of softening and cerebral hemorrhage, are all observed in the brain of aged people.

Senile dementia is probably nothing more than a condition, in much more pronounced terms, of normal senility, due to that common anatomical process of toxic origin causing disintegration in nerve cells and nerve fibers. Thus Leri, from his anatomical studies of the brain in old age as well as from clinical observation, was led to conclude that there is a close relation between the changes caused by old age and those produced by prolonged intoxication. All of this is a strong argument in favor of the theory which holds old age in the brain, as in other organs, to be the result of life's successive and cumulative intoxications.

No evidence thus far adduced is sufficient to convince us that there is such a thing as a strictly old brain. The brain in aged people may present certain morbid changes, but these are in their turn incident to many pathological assaults upon the tissues sustained during life which, in some individuals more, in others less, are in all alike the consequence of infections, intoxications or other morbid influences.

Now we may view the problem from still another angle. The theme of old age, in its more exact sociological aspects, has long received earnest and serious attention. As a matter of general human interest it has been an absorbing topic, even from classical times. Less than half a century ago one of the most effective studies of this subject was carried on under the direction of Dr. George Murray Humphrey, with the assistance of the Collective Investigation Committee of the British Medical Association. The

minimum age of subjects in the inquiry was fixed at 80. Information was received concerning nearly 900 persons who had attained the age of 80 years, including 74 centenarians. Of those who had lived for 100 years or more the record is astonishing not alone because of its numbers, but because of the decisive way in which these people who had successfully completed their century run, had pushed backward and held away at arm's length the blighting devastations of growing old.

The estimates made at that time by the Registrar General indicated that there was one centenarian to about 127,000 persons. If these figures still hold good, there should be in our own country to-day 866 old people who have attained or exceeded the great age of 100 years.

Among the centenarians of Humphrey's report the intellect is said to have been high in 11 and low in 5 only. In the vast majority of them some degree of memory was retained. As many as 39 had a good memory for past events and as many as 26 out of this 39 had the freshness in recollection indicating a good memory for recent events. Seventy-five of these centenarians retained a fairly good memory, while 50 per cent. had a memory with essentially no defects. The intellect in 10 per cent. was entirely preserved and in only 5 per cent. was it completely lost. One of these old people could quote a good deal of the Bible. Another could repeat one hundred psalms correctly. Many of them were remarkable for mental and bodily activity and energy throughout their long lives. Not a few of them had engaged in strenuous toil and active mental work in various occupations and in different ways. They had labored effectively almost to the very end of their long drama which they reached in much better condition than Shakespeare would have us believe to be true of that seventh and last stage of all. Humphrey notes that in this record of extremely long life, women preponderate over men. He believed it to be due in great measure to the relative immunity of women from exposures to which man is subjected. Woman's greater temperance in eating and drinking may also bear decisively upon this age predominance.

Of 824 old people between the ages of 80 and 100 years, 73 per cent. possessed an average amount of intelligence and mental capacity up to the end of their long lives. Twenty-one are said to have been of unusually high intellectual capacity, and only 5 per cent. were rated as low. The history and statistics of all these aged people from 80 to 100 years and more, clearly demonstrates how persistently the brain may resist the harsher inroads of time and maintain itself in its dominating position as the chief executive organ of life far beyond the usual limits of existence.

Such notable instances as these make it seem probable that those fortunate enough to escape or avoid the ordinary hazards of life may carry a healthy brain far into a green old age. Those who fall by the wayside are the victims of accumulating pathology or accident.

In still another way we may obtain a first-hand acquaintance with the brains of old age. It is possible to judge quite fairly of its qualities and characters from the activities and mental capacities of centenarians and octogenarians. What does the brain itself show in these very late periods of life? Several brains of people who lived for a 100 years or more have been studied postmortem. Although the number is limited, it does none the less shed considerable light upon this subject of brain old age.

Dr. Humphrey has given us the post mortem records of people who lived for 100 years and over. His first report is a premier in many respects for the brain of Thomas Parr was not only the oldest ever autopsied, being 152 years and 9 months, but the examination of it was made at the command of Charles I., by Dr. William Harvey, famous for his discoveries of the circulation of the blood. Parr was a farm hand. Even as late as his 130th year he engaged in all kinds of agricultural labor. Up to that time he retained sufficient strength to thrash corn. All of his viscera were sound with the exception of the spleen which was very small. The brain was healthy, firm and hard to the touch.

Dr. James Keill reported on the brain of John Bayles of Northampton who was reputed to have lived to 130 years. His body was emaciated and all of the abdominal viscera pale. There was some ossification of his dura mater in the region of the falx cerebri. The brain was more solid and firm than usual and the ventricles were full of serum. (*Philos. Trans.*, 1706, 25.)

As described by Rolleston, the brain of John Pratt was said to be 107 years old. (*Scientific papers and addresses*, 1, 111). This man's mother lived to be 104 and his grandmother 110. His habits were reported to be something short of strictly temperate. The dura mater was closely adjacent to the skull. The canals of the meningeal arteries were deepened by bands of bone upon either side. The brain weighed 43 ounces. (Rolleston mentions another brain which he had removed from a woman 140 years old weighing 45 ounces.) The convolutions were rounded and to some extent atrophic. The fissure of Rolando and the fissure anterior to it were wider and deeper than natural. The ventricles were somewhat enlarged. Numerous amy-laceous bodies appeared on the surface of the corpus callosum.

The brain of Dr. Holyoke, a physician aged 103 years, was also reported by Rolleston. In this brain the cerebral fissures were considerably widened and filled by hydrocephalus in vacuo (a marked increase in cerebrospinal fluid in the subarachnoid spaces).

Humphrey reports a personal examination of the brain of a woman reputed to be 103 years old. The brain was shrunken; the fissures wide and occupied by subarachnoid fluid (hydrocephalus in vacuo).

Weighing the facts contained in the reports of these five elderly people, it is at least clear that even in advanced years the brain may retain much of its normal appearance and present but a slight degree of that shrinking commonly ascribed to old age. It should be borne in mind that this same decrease in size of the cerebrum has like-

wise been observed in younger persons wasted by long illnesses, in habitual drunkards, and in others suffering from various organic diseases. Only one of these five brains is referred to as showing much shrinking in its convolutions. To offset this is the reassuring fact made on the great authority of William Harvey that the brain of a man 150 years old was healthy, firm and hard to the touch. Taking the evidence obtained from these centenarians for what it is worth, recognizing both its fragmentary nature and its limited extent, we may conclude that in some cases at least the human brain has the vitality to go a considerable distance beyond the 100 year mark and continue to be an efficient organ.

In recent years the brains of many who attained the age of 80 years or more have received postmortem study. Among these are men famed for intellectual achievement of the first order. Many of these famous octogenarians carried on their mental activities almost to the last days of life.

Professor Ernst Haeckel, noted the world over as the propounder of the Biogenetic Law of Recapitulation, and a profound biological student, died in his 86th year. His brain showed some of the senile changes which might be expected in advanced years. It was a large brain and highly convoluted in its frontal and occipital lobes.

Theodor Mommsen, the great German historian, philologist and jurist, died in his 87th year. The examination of his brain at postmortem showed that the vessels at the base of the brain were markedly sclerosed, with areas of pronounced constriction. The entire right side of the cerebellum was softened. Numerous areas of softening appeared in the right hemisphere and quite a number in the left. The largest of these appeared in the frontal lobe and measured 3 cm. in diameter. The remaining focal softenings were small, and apparently older, as they had a yellowish tinge. The brain was markedly edematous over the frontal convolution. The gyres seemed somewhat small and the fissures long and deep. The brain of this

aged scientist was definitely pathological. The morbid changes were due to marked arteriosclerosis with multiple areas of infarction. Some degree of senile atrophy was observed in the convolutions of the hemispheres. This might well have been the result of the extreme vascular disease.

Professor Robert Wilhelm Bunsen died in his 89th year. His chief contributions were in the field of inorganic chemistry, but in the truest sense of the word he was one of the greatest discoverers. In Bunsen's brain the inner surface of the dura was adherent. With the exception of certain anomalous relations in the lateral ventricles, no pathological conditions were found other than a moderate degree of senile atrophy.

It is known that both of these learned men pursued their high intellectual interests well on toward the 90th year. In both of them senile atrophy was present. Mommßen, however, showed distinct changes in the blood vessels as well as evidence of thrombosis, while the slight degree of diminution in size observed in Bunsen's brain would hardly justify calling this brain senile.

The brain of one of the most engaging of modern intellectuals, satirist, critic, philosopher, theologian, historian and politician, has recently been studied. Anatole France died in his 81st year. He remained mentally active almost to the close of life, writing his last book one year before he died. The beauty and lucidity of his style are well known, yet what gave him his greatest influence upon modern times was that wide range of learning which he had so completely at his command and which appeared so inobtrusively throughout his works. At the outbreak of the Great War he was in his 71st year. Too old to serve in the field, he desired at least to show his good will and asked for work in a Government Office at Tours. He was revered in his old age as a genius and a patriarch.

The brain of this illustrious literary master was unusually small (1017 grams). Even allowing for a certain diminution in consequence of age, the brain of Ana-

tole France was much below the mean average of adult brains for this time of life. The investigators who studied this remarkable cerebrum were impressed not by the presence of atrophy in the convolutions, senile or otherwise, but by the remarkable complexity of the convolucional coils and fissures. These were most complex in the frontal and occipital lobes which were described as comparable to the finest pieces of jewelry work ever produced.

It is difficult, if not impossible, to decide from the evidence derived from aged brains exactly what an old brain should look like. The testimony in some cases speaks in favor of a certain degree of shrinking in the convolutions with a real loss of brain substance. Equally prominent instances are cited to indicate that the brain may go a long way toward 100 years and even beyond this mark without showing much of those signs habitually associated with the aging process. It is not at all certain that such appearances as have been ascribed to the aged brain are not due to mild pathological lesions acquired in consequence of previous disease during the course of life.

One may be unwilling to deny that there are essential brain changes due to senescence. It might, however, be difficult to establish an impregnable argument to support this position. Indeed, it seems more reasonable to assume that the changes of old age in the brain are variable, that they vary in the time of their appearance, in their extent and their severity. A brain is not necessarily senile simply because it is 95 years old. Its possessor may be active and alert in the business of life. But if such a brain bears in addition to its burden of years the effects of disease, it is sure to give proof of failing function in direct proportion to the gravity of the pathological lesions.

Old age of the brain is much more often the result of disease than of some inherent aging process. There can be no cavil or dispute concerning the part which disease plays in the actual aging of the brain. In the vast majority of human beings whose mental processes show the enfeeblement of age, it is disease, not years, which has

altered their brain and caused the waning of brain power. It may be that the disease is due to some inherent metabolic process, the nature of which is still altogether obscure. Such are the mysterious conditions in which old age seems to begin in the very cradle and rushes the course of life through a few brief years to its conclusion in extreme senility. Progeria with its uncanny process of swift aging has this result. It appears in early infancy. It rapidly produces senile decrepitude before the child has had an opportunity to pass through early youth. Every organ and tissue of the body at length manifests the signs of extreme old age. Progeria may be somewhat delayed in its first appearance, sometimes beginning as late as the first or second decade of life. But once established, it rapidly sweeps its victim through the various stages of involution.

It has been maintained that this process is due to a persistent infantilism which has none of the potentialities necessary to maturity. The span of life is abridged and old age follows directly in the footsteps of infancy without the intervening stages of growth and development. It is perhaps too early yet to offer an opinion concerning the nature of this mysterious spectre of old age in infancy. It has many earmarks suggesting that it is a condition due to disease.

Apart from such strange disorders as the one just mentioned, factors of disease which produce aging of the brain may be clearly seen. All of those morbid influences which alter the efficiency of the body as a thoroughly coördinated machine, which compromise the efficiency of its metabolism, which cripple one or more of its essential departments, which enforce upon it the need of compensatory activity to meet the bare necessities of life, have their embarrassing effects upon the tissues of the brain. In the course of years they become cumulative to the increasing disadvantage of cerebral activity. All of those causes which impair the efficiency of the circulatory system, which alter the consistency of the arteries, which decrease the effective-

ness of hema exchange, which impair the venous return, which increase or decrease circulatory tension, exert their baneful influences upon the most highly organized tissues of the body, the brain.

Of late years we have become acutely conscious of the effects of a devastating epidemic whose results are most manifest in the brain. This organ as a result of epidemic encephalitis, which we believe to be an inflammation of infectious origin, is changed in many ways. Often times the inflammation produces many signs of old age converting young and healthy persons into decrepit and feeble patients with many of the handicaps, reactions and appearances of senility. Thus we have, in actual experience, encountered a disease which prematurely produces a close resemblance to old age. This great epidemic has opened our eyes. Nature has performed an extensive series of brain experiments from which we may draw new conclusions and see many things concerning the brain in a new light. We are beginning to realize that the central nervous system, the brain in particular, is much more frequently the victim of infection than we had previously supposed. It is not unlikely that many minor illnesses which heretofore we have passed by lightly, have taken an unsuspected heavy toll in depriving the brain of its vital resistance.

Poisonings of many varieties influence the brain unfavorably and facilitate the development of pathological processes. With many of these poisons we are familiar. We know what alcohol, both good and bad, will do to the brain. We know how many are easily poisoned in this way. Year by year we see the increasing effects of such poisoning upon the brain. Arsenic, lead, antimony, mercury and many other toxic substances of which we know, have a similar poisoning effect upon the brain. Many poisons generated within the body itself are also injurious to the brain. Some of these we know. In the main, however, we have barely scratched the surface of the vast subject dealing with toxins either encountered in our com-

plex human contacts or generated within our own bodies. In fact, it is amazing how little general or particular interest man has shown in the most important organ of his body and life. Up to the present time he has devoted relatively little attention and much less capital to the understanding of that part of his machinery which is the secret of his success and the only hope for his future progress, if not his actual salvation.

For diseases of the brain we may be able to excuse ourselves. Our all too feeble efforts have not yet put in our hands the control of or mastery over brain diseases. During the course of life we are surrounded by innumerable and invisible enemies. We hold our place in existence by grace of that tenacity of life inherited from ages of biological existence before us. In some respects we have improved our mode of life, but in many others our lack of knowledge still leaves us almost as defenseless as when our race began. Our present ignorance may be a valid excuse because the attainments of knowledge are relatively new and science is the youngest child of brain development.

There are many other causes of diseases for which we may more justly be reproached. The general principle underlying this group of causes may be summed up in a single word—*intemperance*. This inevitably leads to abuse. Such abuse is due either to wilful disregard of recognized facts or unnecessary ignorance concerning them. Thus, for example, the use of all intoxicating substances the poisonous effects of which are well recognized, is an abuse. It is above all else an abuse of the brain. The disregard of recognized hygienic principles essential to the best mental life is equally an intemperance which results in abuse of the brain. One of the most prevalent forms of disease today, one creating the greatest economic waste, is the so-called nervous breakdown in business and professional walks of life. These disorders are, if anything, on the increase. They are all alike encouraged in their development by excessive demands upon nervous energy and brain power.

All excesses in life which expose the brain to undue strain sow the seeds of disease or prepare the soil for pathological changes. Such abuses may be corrected. The way of going about it brings up many questions. Sumptuary laws and other like regulations might be suggested as a cure. But prohibitions are seldom successful in such corrections. They represent another form of intemperance which often gives rise to abuses worse than the original evils they were intended to control. Wisdom based on exact scientific knowledge, broadly inculcated and widely disseminated, offers the only sure promise of overcoming that intemperance whose harmful influence upon the brain we already understand.

If a large proportion of the change called senile is due to disease or to abuse, such a thing as a strictly old brain must be rare. In time we may learn to control disease and overcome abuse. When that time arrives, gerophobia, the fear of old age and the old age complex, need no longer have their place in the list of human ills. Such a day is still a long way off. Much must be accomplished, much must be changed before its coming. If ever we succeed in bringing about such changes and achievements, we may reasonably expect, among other things, an actual increase in the span of life. We may hope to see a new age not merely of reason but of wisdom. All of this may be most difficult to attain. It is more than worth the struggle. It entails a mighty investment of capital and effort for the further conquest of disease. To continue this work, as yet but feebly begun, is a national and international enterprise. It is not the exclusive concern of medical academies or medical centers. It should be the business of the entire people. They will enjoy the profits; they must be the chief investors.

In the matter of our mental attitude toward old age, progress is also needed. The later years of life should no longer be regarded as the time for retirement, as the days of patient waiting. To grow old gracefully should be to accept old age as the time for which all of the arduous

esses could be ascertained. The value of artificial rejuvenation would also be determined. It is assumed that by grafting testicles or stimulating old ones, rejuvenation can take place. But neither Steinach, Voronoff, nor any of their followers have attempted to verify whether their methods of treatment have brought about a real rejuvenation. After a man of, for instance, sixty years has undergone a testicle transplantation, it should be ascertained if he has been restored to the age of fifty-eight or fifty-five or fifty. This is the only way to decide whether or not the treatment has been successful.

How can we find a method for measuring age? There are several possible ways of doing it. As Claude Bernard taught long ago, cells and humors are intimately connected. Any change modifying one of the components of the system necessarily affects the other. Therefore, tissues or blood serum are equally valuable witnesses of any important organic modifications. The progress of age can be ascertained by the measurement of the residual energy of a fragment of tissues extirpated from the body. But this would not be practical when human beings are concerned, unless some significant change could be discovered in the behavior of the white blood corpuscles. Another possibility, which is also impractical for human beings, is to measure the rate of healing of a wound. In some experiments made during the War, du Noüy found that there is a precise relation between the size of a wound, its index of cicatrization, and the age of the patient. When the area of a wound is measured at four day intervals, and the index of cicatrization calculated according to du Noüy's formula, the age of the patient is determined if located between the years of twenty and forty-five. These experiments were made on practically normal individuals, soldiers otherwise in good health, and the results were surprisingly exact. But the technique is difficult, as the wound has to be kept strictly aseptic, without being irritated by an antiseptic. It appears that the only possible method for measuring old age must be based on certain physiological and chemical modifications which occur in

blood serum. During the course of life, blood serum, undergoes a progressive change, and becomes more and more inhibiting to the growth of colonies of tissue cells. This is a significant phenomenon, and can easily be measured. The technique is as follows:

Blood plasma is taken from an animal and the cells are removed by centrifugation. The effect of serum is then tested on a pure culture of fibroblasts. Each culture is divided into two halves. One is cultivated in a saline solution and the other in the serum which is to be studied. For a few days, the surface of the growth is measured. The ratio between the growth in serum and that in saline solution is called growth index. The value of the growth index is equal to unity in a dog a few weeks old. It rapidly decreases as the animal grows older. In a dog of three or four years, it may be about 0.3. It reaches a value less than 0.1 in animals of 10 or 11 years. Through the changes in the growth index, the curve of aging of a given individual can be established. This curve at first slopes down very quickly. The process of aging is very rapid at the beginning of life, as Minot showed long ago. But toward the end of life, it takes place very slowly.

This technique is still far from being precise. It does not supply us with an absolute value of the age. But it allows us to follow the process of aging in a given animal. If rejuvenation can be produced, there is no doubt that through the measurement of the growth index of serum before and after the operation, its detection would be possible. Imperfect as it is, this method supplies us with the means of determining an important change brought about in the organism by the process of aging. This is the essential basis of a scientific study of old age.

THE AGING OF THE HEART MUSCLE REGARDED FROM A GENERAL BIOLOGICAL POINT OF VIEW¹

(ABSTRACT)

ALFRED E. COHEN

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Let us first review the theoretical background without which a discussion of the processes of the aging organism is difficult and indeed incomprehensible. While the average expectancy of life at birth has increased substantially during recent years, the expectation of life in the later decades has not increased. Whether seventy years is to be regarded arbitrarily as the average anticipated span of life cannot be decided without further investigation.

For the body to become weak, for the heart and indeed all the tissues to become desiccated and to undergo the many other chemical and physical changes which are easily conceived to be necessary if the equilibrium of the forces and substances which are involved is to be maintained in harmony, is the natural result in the aging organism. How long the span of this process may be, whether and how much it may be extended, experience does not yet tell us. But of one thing surely there may be certainty; this process cannot be prevented by any means so far discovered. The hope which is held out in this direction seems bound in some sense to be frustrated. Of far greater usefulness is the effort by whatever hygienic or other means to provide an environment in which the aging process may be accomplished to its best and most undisturbed advantage.

of man will, I believe, go forward best when to the main stream of biological thought. around it becomes easier to understand phenomena must be investigated in order diseases so called of old age.

With improvement in hygiene, more and more people come into the position of realizing their natural and allotted span of years. For this reason the structures which appear to bear the brunt of the stress of life are the heart and the blood vessels. I say 'appear to bear this brunt' because medicine and physiology, being still youthful sciences, find it useful and easier to think in mechanical terms. It is not that other organs and tissues are not also exposed to wear and tear but that the mechanical stress of the heart and circulation is obvious. Types of affection of the heart were involved in the complaints of men of advanced years, such as thrombosis of the coronary artery, angina pectoris, and pain of other and not yet well defined causes.

It has been my object to emphasize the fact that human beings are growing creatures. Their anatomy and physiology cannot be described completely if the description is made to apply to a selected period of life. Growth is a continuous process, always in the throes of change, constantly exhibiting new and altering phenomena until the phrase 'the child is father of the man' takes on new meaning. Child and man are indeed two distinct individuals. If their natures are different, so are the ills to which they are liable, and so the remedies which it is the high function of medicine to bring to their relief.

COMMITTEE ON MEDICAL EDUCATION

EXTRACT FROM A REPORT OF THE SUB-COMMITTEE IN CHARGE OF THE GRADUATE FORTNIGHT

"Believing that our experience may be of some value for the next Graduate Fortnight, the following suggestions are herewith submitted:

"The topic for the next Fortnight might be chosen with a view to making the annual Graduate Fortnight not merely an effort of scientific contribution but also to prepare for the place which the Academy might occupy in the leadership of medical progress in the widest sense of the word. The changes which we may reasonably expect in the future of medicine concern less the gaining of new scientific discoveries as their distribution through channels which will reach practitioners quickly and effectively, and they concern even more those mechanisms which will establish the science and practice of medicine as a social factor. In individual and public hygiene of all sorts, preventive as well as constructive, the medical profession must receive the intelligent cooperation of our commonwealth, financially and otherwise, and therefore it seems to your committee that the Academy has an unusual opportunity of fostering enterprises which will more and more link together social leadership with the leadership in scientific medicine. With these thoughts in mind it is felt that a subject would be the more useful the more it attracted, aside from the medical profession, social workers and all those interested in public welfare. A subject which would lend itself particularly to this purpose would be one that covered the field of functional diseases in the borderland of medicine, neurology and endocrinology, and reached into every branch of medicine and surgery. The field includes all those functional disturbances which have been much neglected in the last thirty years in comparison with the structural disturbances of the human body. Because of this and for other reasons it has become the happy hunting ground of all the 'isms' and cults in our country and organized medicine can do no better than to occupy

this field and make it the center of interest in such an enterprise as the Graduate Fortnight, with some such title as, 'The Mind and Functions in the Problem of Human Diseases.' Such a topic would cover differential diagnosis of functional and organic derangements in all branches of medicine and surgery. It would also include the topics of neurasthenia, neurosis, psychoneurosis, and of mental hygiene in its widest meaning. It would give an opportunity to invite outstanding leaders of public welfare to participate in our Fortnight."

THE DIAGNOSIS AND TREATMENT OF PREPARALYTIC POLIOMYELITIS¹

W. LLOYD AYCOCK

Harvard Infantile Paralysis Commission and Vermont Department of
Public Health

In considering the poliomyelitis problem account should be taken of the possibilities in regard to prevention of the disease. Measures directed toward this end can come only from an understanding of the chain of circumstances which make for the occurrence of the disease. I should like, therefore, to review briefly some phases of its epidemiology in order that we may have a clearer understanding of the procedures which should be employed in our attempts to alleviate the distress caused by this not very common, but none the less alarming disease.

I need not dwell upon the evidence that the disease is caused by a filterable virus, that class of infectious agents which differ widely from bacteria in their morphological, cultural and immunological characteristics, nor need I stress the evidence that the disease is transmissible. Experimental evidence relating to ingress and egress of the virus through the upper respiratory passages indicates the likelihood that the disease spreads by contact and is in

¹ Delivered before the Section of Medicine, October 16, 1928.

accord with the theory that the virus spreads largely through persons not actually sick with the disease. Limitation in the procedure necessary for the detection of the virus has not permitted anything approaching a real survey of the distribution of the virus. Perhaps partly for this reason and because of the lack of evidence ordinarily sought to establish contagiousness, that is, the occurrence of the disease amongst those associated with the sick, there has been much speculation concerning some more or less mysterious origin of the disease.

Evidence of another sort giving a quantitative idea of the mode and extent of the spread of the virus is found in an analysis of some of the general epidemiologic features of the disease. Correspondence between the age distribution phenomena of this disease and that of measles and diphtheria, the mode and extent of spread of which are readily measured—in measles by observance of actual attacks of the disease and in diphtheria by the occurrence of the clinical disease, the carrier state as shown by culture, and immunity as indicated by the Schick test—affords evidence, indirect but none the less convincing, that the virus of poliomyelitis spreads with the same rapidity and probably to the same extent as the virus or organism of these more common contact diseases. In the epidemiologic sense measles is perhaps the simplest of the transmissible diseases. Everyone is susceptible. Opportunities for infection are so great that everyone contracts the disease relatively earlier or later in life depending upon the facilities for contact (concentration of population) and is thereafter immune. The result is that the age distribution of measles at a given time is in a sense a measure of existing immunity from previous attacks of the disease. This interpretation of the age distribution of measles is in entire accord with such observations as the equal susceptibility of persons of all ages when measles is introduced into an isolated locality previously free of the disease, and with the simple observation that practically everyone develops measles in the course of a life time. That the age distribution phenomena of diphtheria is likewise due to im-

munity, although only approximately 10 per cent. of individuals develop clinical diphtheria, is now demonstrated by the Schick test. That the organism of diphtheria spreads with equal rapidity according to concentration of population and produces immunity corresponding in extent to that of measles is shown by its identical age distribution phenomena. The essential difference in the mechanism involved is that in the case of diphtheria immunization is accomplished in the majority of instances without the occurrence of the clinical disease, as is now well known both by the Schick test for immunity and from the occurrence of the organism as shown by culture in individuals who have not passed through an attack of the disease.

Since poliomyelitis possesses the same characteristics in regard to age distribution as these two more common diseases, the mode and the extent of spread of which are now beyond dispute, it seems clear that the virus of poliomyelitis must be disseminated by the same mechanism, giving rise to a similarly widespread immunization, in the course of which the recognizable disease is produced in a relatively much smaller proportion of individuals actually attacked by the virus. This conception of the extent of the distribution of the virus of poliomyelitis is further borne out by observations regarding the age distribution, seasonal fluctuation and relative frequency of the disease according to climate. As in the case of diphtheria, there is evidence, for example, that the diminution in the occurrence of poliomyelitis as warmer climates are approached is due more to a variation in the frequency with which the virus causes the recognizable disease rather than to any reduction in the extent to which the virus spreads. In fact one sees indications in such studies that the occurrence of the disease (either individual cases or epidemics) may in reality be assigned more to some alteration, either local or general, seasonal or climatic, in what may be termed physiologic resistance (as distinguished from immunity in the strict sense) rather than to any variation in factors relating to the virus.

assume a comfortable sitting position without propping themselves up on their arms. Anterior flexion of the spine often causes a drawing pain in the lumbar region. Kernig's sign is not usually marked at this stage, but the deep reflexes are frequently hyperactive rather than diminished, as they are later. A cerebral tache is almost always present. It is the presence of these signs and symptoms which justifies a probable diagnosis of anterior poliomyelitis and calls for the final step in the diagnosis. This step is examination of the spinal fluid. The fluid is usually under only moderately increased pressure (from 150 to 200 mm. of water). Macroscopically the fluid appears to be clear, but when viewed by transmitted light it presents a faint haziness which has been described by Zingher as a "ground glass" appearance. There is an increase in cells, usually between 50 and 250, but occasionally as high as 700 to 800, or as low as 20. These cells may be largely polymorphonuclear early, but later are lymphocytes. There is an increase in globulin; sugar is normal.

Other acute infections accompanied by meningismus may simulate the clinical picture of early infantile paralysis, but usually the cause of meningeal irritation becomes evident on physical examination, while in the event of doubt the lumbar puncture as a rule gives a normal spinal fluid. Tuberculous and syphilitic meningitis or encephalitis may give a spinal fluid which may be confusing; however, the clinical picture and possibly spinal fluid sugar is usually sufficiently different that one may avoid mistakes.

A certain proportion of patients (from 10 to 15 per cent.) give a history of having had a mild gastro-intestinal upset consisting usually of headache, fever and vomiting and lasting only a day or two. In the majority of these cases this occurs exactly five days before the onset of what has just been described as the preparalytic stage of the disease. During this preliminary episode, which we are inclined to regard as a systemic reaction to the presence of the virus, there are no signs or symptoms which would suggest involvement of the central nervous

system. Incidentally, the signs and symptoms observed during this preliminary attack correspond to those sometimes seen in families with frank cases and which are suspected as being abortive cases of poliomyelitis.

The chief difficulty in gaining any idea of the effect of any method of treatment in this early stage of the disease is the entire lack of correlation between any of the manifestations of the preparalytic stage and the extent or severity of the paralysis which follows. Paralysis does not appear in the majority of cases until from 48 to 72 hours following the onset of the preparalytic symptoms. There is, further, no statistical data upon which the frequency of paralysis or its severity may be predicted in cases in which a diagnosis is made in the preparalytic stage.

The epidemic prevalence of poliomyelitis in Massachusetts in 1927 afforded an opportunity for the treatment of a comparatively large series of cases in the preparalytic stage under fairly uniform conditions. It was felt that the inclusion of cases in which paralysis had already appeared would only introduce complication in determining the effect of treatment, in that, according to the lateness of treatment, an increasing proportion of cases would have advanced to a point beyond which there is at least no theoretical advantage in the treatment employed. Since there are no criteria for determining in advance the possible severity of a given case, nor indeed whether or not paralysis will ensue, no attempt was made to individualize the treatment. Our chief aim was to treat a comparatively large number of cases in a uniform way in the hope that the outcome of these cases would be of some statistical value as compared with that of untreated cases. To this end every patient seen by us within the first four days of the disease, who was still febrile and in whom paralysis had not appeared, was treated. The series may therefore be regarded in a sense as consecutive. That we were not dealing largely with a non-paralytic form of the dis-

ease is indicated by the fact that 65 per cent. of the treated cases subsequently developed some degree of paralysis.

Numerous reports appear in the literature concerning the treatment of poliomyelitis by several methods. In many instances the number of cases is small and in some the diagnostic criteria are not given in full and finally the outcome of the cases is not exactly measured nor is the outcome of untreated cases in the same outbreak given for comparison, so that the literature leaves one in doubt as to the efficacy of any of the methods employed.

For the reasons which have been outlined by Dr. Flexner in the preceding address convalescent serum was chosen as the method of treatment. Each case received two intraspinal injections on successive days, an intravenous injection being given on the first day. Twenty c.c. was given as a rule intraspinaly on each day and the intravenous injection varied from 20 to 60 c.c., according to the supply available at the time.

In all 106 cases were treated, this representing all cases seen by us during the preparalytic stage in the course of the 1927 epidemic in Massachusetts and comprising approximately one tenth of all cases reported. No cases were included where both the clinical picture and spinal fluid findings were not typical of preparalytic poliomyelitis. Subsequently the paralysis in each case was measured by muscle examination, done by the after-care department

Harvard Infantile Paralysis Commission. For comparison similar muscle examinations were available on approximately one half of all cases which were reported in the epidemic in 1927. The five grades of paralysis described by these muscle examinations are based on the strength of the affected muscles as compared with a normal child. A comparison between groups of cases at different stages of the disease. Grades of 1, 2, 3, 4 and 5, have been assigned to represent grades of involvement, 1 representing the least involvement and 5, a total loss of muscle power.

RESULTS

The case fatality rate for poliomyelitis in Massachusetts was 14 per cent. One of the 106 cases treated with convalescent serum in the preparalytic stage died. However, it is believed that at least a part of this apparent reduction in case fatality rate is probably attributable to the fact that in a certain proportion of bulbar cases, particularly those with paralysis of deglutition, the preparalytic symptoms are either very mild or apparently absent, so that such cases might not be included in any series of treated preparalytic cases.

The average paralysis of the three milder grades per case in the treated group was 45, 32 and 26 per cent. of that in the average untreated case. In the two severer grades the average paralysis in treated cases was only 12 and 9 per cent. of that in the untreated cases.

CHART I

Since for obvious reasons it was not deemed practical to conduct a controlled experiment such as, for example, the treatment of alternate cases which were diagnosed in the preparalytic stage of the disease, the apparent result in the serum treated cases is open to the criticism that mild and nonparalytic cases, which ordinarily would be missed, are included. It has already been pointed out that none of the early signs of the disease gives any indication as to its probable severity, nor are statistics available which give any idea of the extent of the occurrence of the milder forms of the disease. It should likewise be pointed out that evidence that such forms of the disease do comprise any large proportion of cases is equally lacking. Thus, the extent to which the inclusion of such cases has influenced the apparent results of serum treatment is purely a matter of opinion. Upon the ^{assumption} ~~the inclusion~~ that the difference in paralysis between treated ~~and~~ ^{untreated} cases is due to the inclusion of mild cases in the treated group which were missed in the reporting of cases in general, it may be calculated that there must have oc-

Average Severity of Paralysis

Untreated Cases



Treated Cases

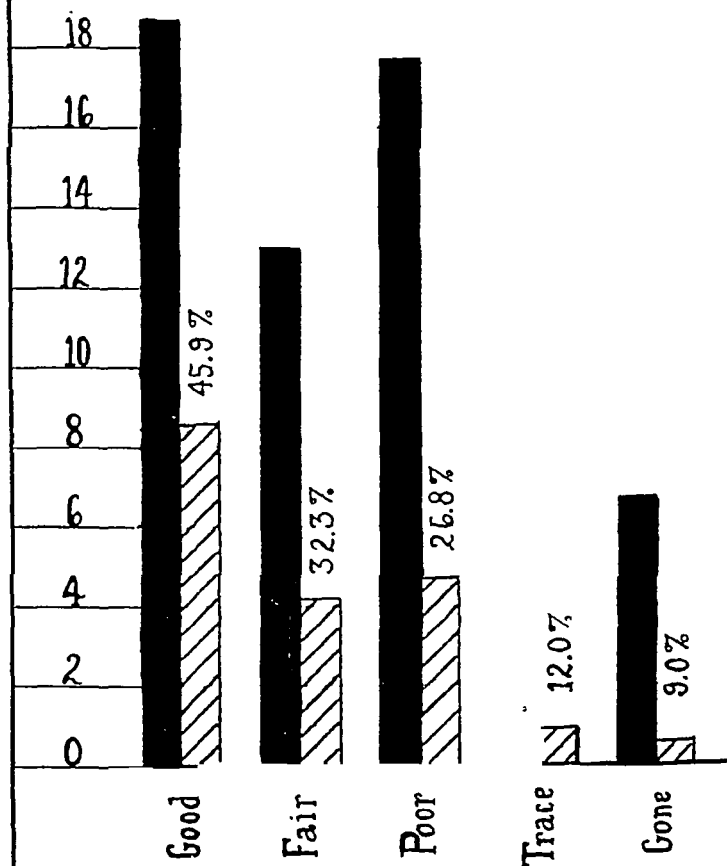


CHART I.

curred approximately ten times as many cases as were reported.

CHART II

In Chart 2 is shown a comparison between the average distribution of paralysis in the treated group of cases, considering only those treated cases which subsequently developed some degree of paralysis, and untreated cases. All of the treated cases (35 per cent.) which developed no paralysis were excluded on the assumption that they might have represented cases ordinarily missed. The average paralysis in the treated case which resulted in paralysis is then markedly less than that observed in the average untreated case. Carrying the assumption that the apparent result of serum treatment is due to the inclusion of mild cases a step further, a comparison between the average paralysis in the worst one fourth of the treated cases with that of untreated cases is shown in Chart 3.

CHART III

It happens that the worst one fourth of the treated cases show approximately the same total units of paralysis as untreated cases, but the distribution of paralysis in the treated cases is of quite a different order, there being relatively more paralysis in the three milder grades, "good," "fair," "poor," but relatively less in the two severe grades, "trace" and "gone." From the point of view of prospective recovery, then, even the worst one fourth of the treated cases are to be considered of a much less severe involvement when it is borne in mind that something like 50 per cent., 40 per cent. and 30 per cent., respectively of "good," "fair," "poor" muscles ultimately recover while in the two severe grades less than 5 per cent. ever return to normal function.

The conditions existing in Haverhill are of interest in connection with the assumed influence of the inclusion of "missed" cases in the treated group. During the 1927 epidemic 110 cases occurred in Haverhill, a city of 47,000, or 2.3 cases per thousand of population, a rate exceeding that of the 1916 outbreak in New York City. A general

Average Severity of Paralysis.

Untreated Cases



Treated Cases

Developing Paralysis

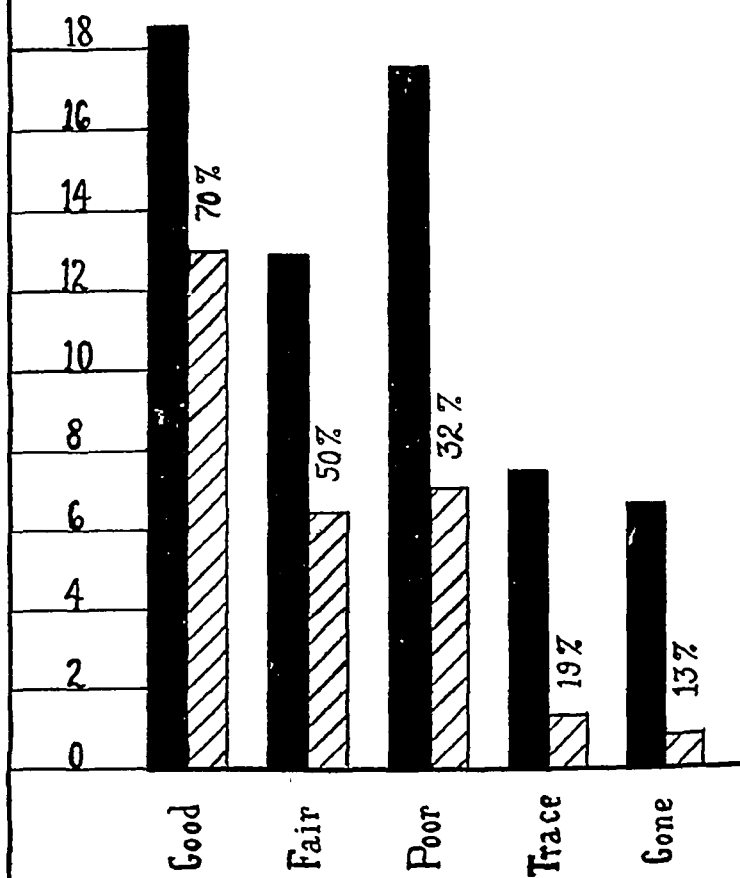


CHART II.

state of alarm prevailed, school and other public places were closed to children. Newspapers carried daily headlines as to the progress of the epidemic. In short, the epidemic was the foremost event in the minds of the public. Frequent meetings of the medical profession were held in which early diagnosis and serum treatment were discussed. Not only was the medical profession thoroughly alert to the situation, but any illness, however trivial, was feared by parents and a physician was called. Such conditions afforded an ideal opportunity for the discovery of "missed" cases. During the epidemic one of us and at times three of us were constantly in the city and had the opportunity of seeing every case of illness in which there was even the remotest suspicion of poliomyelitis. The result was that we saw a large number of sick children, in practically all of whom some disease other than poliomyelitis could be positively diagnosed. There were only a very few cases of mild febrile disturbance which could have been suspected as abortive poliomyelitis. It may be further observed that of the 110 patients in Haverhill fifteen died, a case fatality rate of 13.6 per cent., which does not differ significantly from that of the state at large (14 per cent.). It may therefore be stated that the intensive investigation in Haverhill did not disclose any evidence of the occurrence of a large proportion of "missed" cases.

CONCLUSION

The difference between the outcome of 106 cases of poliomyelitis treated in the preparalytic stage and untreated cases reported in the same outbreak can only be assigned to either of two factors, the beneficial effect of convalescent serum or the inclusion amongst the treated cases by reason of early diagnosis of a preponderant number of cases of mild forms of the disease but with meningeal involvement which are missed in the reporting in general. The lack of evidence of the occurrence of mild "missed" cases in numbers actually exceeding reported cases leads us to the conclusion that convalescent serum is effective in the treatment of preparalytic poliomyelitis.

Average Severity of Paralysis

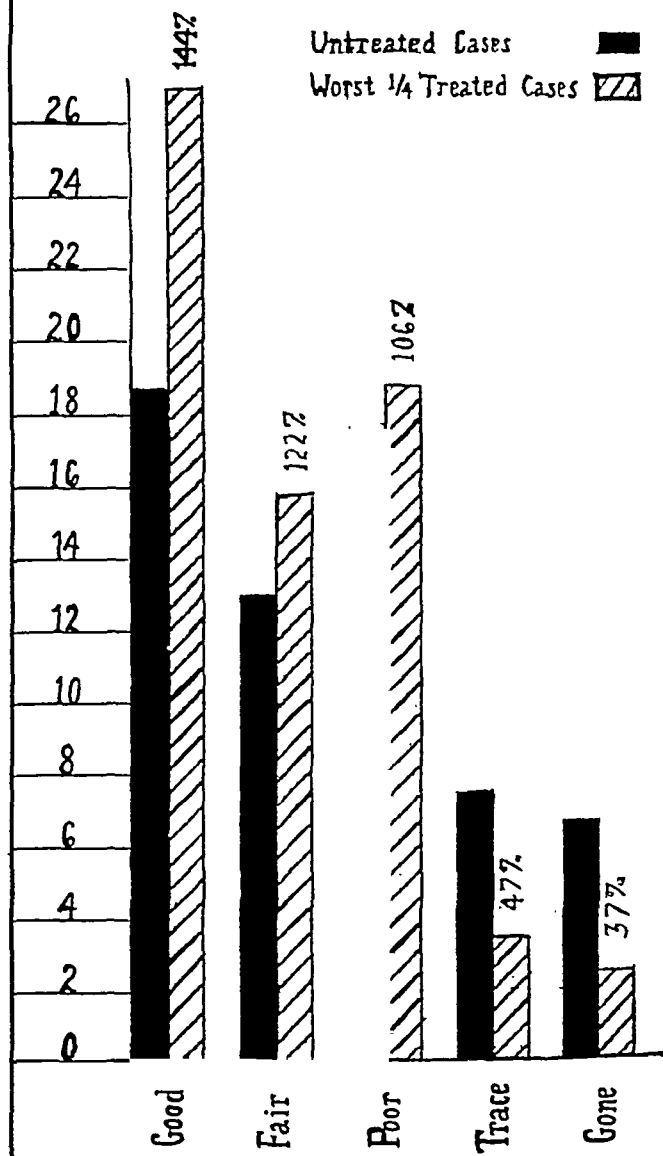


CHART III.

IN MEMORIAM: DR. HERMAN G. KLOTZ¹

HENRY H. MORTON

In the days before cystoscopy and prostatic and kidney surgery had brought about the development of modern urology into a distinct specialty, the universal practice was the combination of skin and venereal diseases, and the death of Doctor Herman G. Klotz marks the passing of perhaps the last of the well-known dermato-urologists of the former generation. Dr. Klotz was born in a small town of Saxony in 1844; studied medicine at Wurzburg and Heidelberg and graduated from Leipzig in 1864. In the war of '66 between Prussia and Austria, he received a decoration from the King of Bavaria (the Bavarian War Cross) for services to the wounded.

His coming to America was a matter of accident, for while awaiting appointment in the Eppendorfer Krankenhaus he took a trip to New York as ship's surgeon on a steamer of the Hamburg-American Line. When the Franco-Prussian war broke out his ship was interned, and he took a position as resident physician in the German Hospital (now Lenox Hill). After leaving the German Hospital, he married Miss Marie C. Schwedler, daughter of his former chief, Dr. Schwedler.

In the course of his professional life he soon developed an interest in dermatology and urology, as these branches were then associated.

He was actively identified with the development of the German Hospital and Dispensary, and particularly interested in developing its medical library which was then housed in the old dispensary building on 2nd Avenue near 8th Street.

Dr. Klotz became naturalized soon after coming to the United States, and held steadily to his loyalty to this country during the World War, even though his allegiance cut him off from his father's relations in Germany during hostilities. He was a member of The New York Academy of Medicine, served on the Library Committee, and was

¹ Delivered before the Section of Medicine, October 16, 1928.

June 14, Afternoon Session.

Discussion of the Respective Fields of Public and Private Hospital Work.

June 15, Morning Session

Discussion of Questions Relating to Psychopathic Hospitals and Hospitals for the Chronically Afflicted.

June 15, Afternoon Session

Discussion of the subject of an International Hospital Association and the creation of an International Hospital Bureau—Consideration of any action necessary—Arrangements for the Second International Hospital Congress—Closing Address.

Contributions by foreign delegates on other subjects will, insofar as circumstances permit, be presented at the annual session of the American Hospital Association.

PAPERS

The principal papers on the subjects enumerated above will be printed in full and circulated in advance in English, French and German, the authors being requested to send their contributions to the Secretary General not later than February 1, 1929.

ISSUE OF OFFICIAL INVITATIONS

The Chairman and Secretary General of the International Executive Committee are authorized and requested to send official invitations to the various governments through the intermediary of the Secretary of State in Washington, forwarding at the same time a questionnaire on the hospital situation and hospital statistics in each country.

SCIENTIFIC EXHIBIT

The American Hospital Association was invited to prepare a general scheme for the Scientific Exhibition to be held from June 13 to June 22 in connection with the International Congress and the annual session of the American Hospital Association. Each National Section will be organized under the responsibility of its respective National Committee, which will undertake to show, by means of diagrams, the general organization of the hospital system, the number of beds, the cost of maintenance, and new

developments in the field of hospital construction, equipment and management. Each National Section will be assigned a portion of the available space to be determined by the American Hospital Association. The costs of transportation, insurance during transport, and arrangement of the exhibits will be borne by the respective National Committees, the use of the space being free.

COMMERCIAL EXHIBIT

The same rules apply to commercial exhibits, each National Committee to get in touch with the leading commercial organizations existing in their respective countries, and to assume responsibility of accepting or refusing any kinds of goods, the principle being, however, that the exhibition aims at showing important industrial progress accomplished in the field of hospital equipment and supplies. It is requested to keep the charge for space in the Commercial Exhibition as low as possible, and that arrangements be made for bonding the exhibits.

VISITS TO AMERICAN HOSPITALS

The plan entertained by the American Hospital Association to organize a tour in order that the official delegates may have an opportunity to visit the hospitals of New York, Philadelphia, Baltimore, and elsewhere has been gratefully accepted, with the recommendation that the tour begin in New York on June 5 and end in Atlantic City on June 12.

Every member is entitled to speak in whatever language he chooses.

Abridged translations will be made whenever possible in as many languages as appear necessary. The reports and proceedings will be published in English, French and German.

The Congress shall not formulate resolutions relating to technical subjects.

It was suggested that Sir Berkeley Moynihan, president of the British Association of Surgeons, be invited to de-

liver the inaugural address on the Essential Hospital Functions. It was voted to request Dr. S. S. Goldwater, for the paper on Hospital Planning, and to ask Pro. Grober for the paper on Hospital Economics. A Dutch speaker to present the report on Public and Private Hospitals, a Danish speaker the report on Psychopathic Hospitals, Prof. Tandler (Vienna) the report on Chronic Hospitals, M. Brizon (Lyon) the report on National Associations and the creation of an International Association. The questions of training of personnel and of hospital statistics should be left for the second Congress, or to be dealt with at the Annual Session of the American Hospital Association.

After discussion, the report and recommendations were all approved.

Dr. Wirth (Frankfurt) reported for the sub-Committee, laying a complete text before the committee, suggesting the appointment of a Treasurer General, and proposing that the present Executive Committee should remain active until the opening of the Congress. The report was approved, the selection of the Treasurer General being left to the Committee on International Hospital Relations of the American Hospital Association.

Dr. Elsass (Berlin) reported for the sub-Committee on Exhibition and Publicity.

In the discussion of the report it was suggested that not only general hospitals, but special hospitals, including psychopathic institutions, should be admitted to take part in the Scientific Exhibition.

The chairman explained that the whole work of preparation had been done in America and admirably conducted by Dr. Lewinski-Corwin and Dr. Goldwater. He voiced his feelings of gratitude to the members of the Committee, who had so promptly and wisely dealt with the questions submitted to them.

On the kind invitation of M. Chennevier, the members of the Committee visited various establishments of the

Assistance Publique de la Ville de Paris. They also visited the American Hospital at Neuilly.

R. SAND, *Chairman.*

ANNUAL REPORT OF THE HOSPITAL INFORMATION AND SERVICE BUREAU OF THE UNITED HOSPITAL FUND SERVICE BUREAU

After five years of existence, the position as well as the character of the work of the Hospital Information and Service Bureau has been definitely established.

The following figures do not portray the character of the work; they do, however, give a certain idea of the expansion of the informational and assistive services rendered by the Bureau:

<i>Year</i>	<i>Requests for Information or Advice</i>
1923.....	944
1924.....	1,087
1925.....	1,454
1926.....	1,715
1927.....	2,013

It is impossible in this necessarily brief report to describe or even to list completely the multifarious activities of the Bureau. The present summary is, therefore, limited to the statement of certain activities and to the mention of several problems of importance to the hospital field of New York City.

DIRECTORIES OF HOSPITALS AND CONVALESCENT HOMES

At the invitation of the Welfare Council of New York, the Bureau undertook to prepare the Sections on Hospitals and Convalescent Homes for the Directory of Social Agencies published by the Charity Organization Society. These sections appear as separate entities and have been issued separately as reprints for distribution among the social service agencies.

STATISTICAL SERVICE

The Bureau collates annually the data published in the annual reports of hospitals. It also helps to prepare the statistical sheet of the United Hospital Fund which is of recognized value to the hospitals of the City as well as elsewhere. In addition, the Bureau makes certain up-to-date graphic charts of pertinent statistical facts, such as the bed capacity in general and special hospitals, the contributions of pay patients, the number of employees in various hospitals, the cost of food and the like. These charts are annually exhibited at the meetings of the American Hospital Association, and constitute the exhibit of the United Hospital Fund. The data secured and compiled by the Bureau serve as a basis for frequent educational releases to the daily press.

The tabulation of stillbirths and maternal deaths has been continued with the coöperation of a group of eminent obstetricians who have been meeting regularly every month.

SURVEYS OF HOSPITALS

Acting as an agent of the American Medical Association and the American College of Surgeons, the Bureau staff surveyed a considerable number of hospitals and private sanatoria.

It may be of interest to mention the fact that the growth of proprietary hospitals has been considerable during the past year. The Bureau has compiled a list of over 100 such institutions within the limits of the Greater City.

CONVALESCENT SERVICE

It is the primary aim of the Convalescence Service Department of the Bureau to promote high standards of care, and to bring about an increased utilization of the existing facilities. The monthly statistical tabulations and the frequent conferences and discussions arranged by the Advisory Committee gradually lead to a better realization of the existing needs and deficiencies. In order to stimulate

better utilization of all available opportunities, the Bureau informs the Social Service Departments of the hospitals of vacancies in convalescent homes. There is likewise a record kept of the sources of reference to convalescent homes which throws valuable light on the situation. During the past year 50 per cent. of the patients in convalescent homes came from the out-patient departments, 35 per cent. were recruited from hospitals, 3 per cent. from unattached clinics, 8 per cent. from miscellaneous sources and only 4 per cent. were referred by private physicians. In order to bring the matter of existing facilities to the attention of the medical profession, a notice was inserted in the local medical press offering the facilities of the Bureau for placing the appropriate types of patients in convalescent homes. A summary of the work was published by the Chairman of the Advisory Committee in the April, 1928, issue of the Bulletin of The New York Academy of Medicine.

The Bureau has been requested by several homes, which do not maintain admission offices in the City, to act as the placement agency in the City. This work has been undertaken for seven homes, and in so far as the child patients are concerned, the Bureau functions in close coöperation with the Children's Welfare Federation.

During the past year study was made of the available facilities for the treatment of children with chorea.

The Special Advisory Committee on Convalescence meets monthly and discusses all the problems that come up before the Bureau and reviews the work in this field. The same Committee acts as the Executive Committee of the Section on Convalescence of the Welfare Council.

EMPLOYMENT REFERENCE SERVICE

The high labor turnover in hospital service, particularly in the lower grades of it, is a matter of concern to many of the hospital administrators. Following a survey of the situation made by the Committee on Help in Hospitals of the Tuberculosis Sanatorium Conference of Metropolitan

New York, the United Hospital Fund was requested to aid in setting up an employment reference service as well as an employment exchange as a part of the work of the Bureau.

The matter was considered at length and it was finally decided by the Executive Committee of the United Hospital Fund that such a service does not come within the functions of the Fund.

EDUCATIONAL ACTIVITIES

The members of the staff are frequently called upon to give lectures or to participate in conferences on the various phases of hospital, out-patient and convalescent work or organization. They are also called upon to contribute papers or discussions to professional magazines.

Expressions of endorsement of this activity of the Bureau have been received. An eminent leader in the public health field wrote recently in part: "You are certainly performing a splendid service in the development of standard practice in connection with hospital and dispensary administration."

COLLECTION OF HOSPITAL PLANS

The Rockefeller Foundation has made the Bureau the custodian of over 800 hospital and medical school plans which it has collected during the years of its interest in the promotion of medical education and hospital projects. This valuable collection of plans and blue-prints constitutes the nucleus of a collection which probably is unrivalled in the variety of architectural design and type of hospital service.

AMBULANCE SERVICE

The Bureau has been in touch with the Ambulance Board and has followed the development of the ambulance service in the city. During the past year certain features of it were brought to the attention of the Bureau by the Committee on Public Health Relations of

The New York Academy of Medicine. In the report submitted, the Committee expressed the belief that eventually all ambulance service will have to be carried on by the municipality. It pointed out that in the long distance hauls of ambulance patients no hazard to life is involved, with the exception of cases of acute hemorrhage, wounds of the abdomen and conditions requiring tracheotomy, and called attention to the fact that many people when injured in the streets, or otherwise, are taken in taxicabs to nearby hospitals with the result that hospitals do not lack experience in traumatic surgery irrespective of whether or not the hospital maintains a public ambulance.

DOMICILIARY DISTRIBUTION OF HOSPITAL PATIENTS

In connection with surveys which the Bureau is called upon to make, particularly when the question of enlargement of a hospital or removal to another location is concerned, studies are made of the domiciliary distribution of patients of the hospital concerned. An analysis of the available data indicates that a general hospital serves as a neighborhood institution only in so far as the wards are concerned, and even there this is more true of part pay and free patients than it is of the full pay ward patients. With regard to private or semi-private patients, the tapping area of the hospital depends entirely upon the dispersion of the clientele of the visiting staff.

HOSPITAL PEAK LOAD

The question has been raised whether the hospital facilities of New York City are sufficient to meet the demands at the season of the year when there is the highest prevalence of disease. Inquiry was made of twenty-six general hospitals with regard to the months of heaviest demand. March was the month of heaviest demand in ten of the twenty-six hospitals; May in five. In two hospitals January is the heaviest month of the year; in three April; in two June; in two October; in one December and in one August. It is surprising that in some instances the months of June, August and October are the months of highest utilization.

A further inquiry was made as to whether on the day of the largest utilization in the heaviest month of the year the demand was taxing the entire available capacity. There were three hospitals in the group on this particular day where there were no beds available. In the remainder of the hospitals, there was a fair margin of unoccupied beds.

This finding seems to indicate that, barring unexpected emergencies, the hospital facilities of the city are equal to the normal demand—even at the heaviest periods of the year.

ADVISORY COMMITTEE OF SUPERINTENDENTS

Under the chairmanship of the Rev. Mr. George F. Clover of St. Luke's Hospital, a committee of hospital superintendents has met at frequent intervals during the year and discussed problems of importance coming before the Bureau. The judgment of experienced hospital administrators has been found to be of inestimable value. At a dinner given by Dr. George David Stewart, Chairman of the Bureau Committee, the general policies and methods of the work of the Bureau were discussed at length.

INTERNATIONAL RELATIONS

At the suggestion of the Director of the Bureau, the idea of an international hospital conference has been promoted by the American Hospital Association. At a meeting of hospital representatives of nineteen countries which met in Paris on September 19, 1927, the Director of the Bureau was elected Secretary of the International Executive Committee and has been actively engaged in the organization of an international hospital conference which will take place in the United States in the spring of 1929. This will be the first conference of its kind on record.

NEW HOSPITAL FACILITIES

The Bureau endeavors to keep an account of the new projects as well as of the progress of new construction in the hospital and convalescent fields. During the past

year, hospitals have dominated the institutional building field even more than usual. Important units of the new Columbia Presbyterian Medical Centre have now been completed and the Presbyterian Hospital opened its doors to the public in April. The following additional items are presented here for brief review:

New Buildings Completed
(Total Cost Over \$16,000,000)

St. Luke's Hospital—addition to the private pavilion
 St. Mark's Hospital
 Beth Israel Hospital
 Sydenham Hospital
 St. Elizabeth's Hospital
 West Side Hospital and Dispensary
 Bronx General Hospital
 Bellevue Hospital—Pavilion F for tuberculosis patients; pavilion G for neurological patients.

Ground Broken or Building Operations in Progress
(Over \$28,000)

French Hospital
 New Medical Centre—Babies Hospital; Neurological Institute
 Bronx Hospital
 Home for Incurables—Barker Memorial Building
 Lutheran Hospital (Brooklyn)
 St. John's Hospital (Brooklyn)
 Mary Immaculate Hospital
 Bellevue Hospital Out-patient Building
 Rockefeller Institute—a building to house library and dining room.

Alterations

Bellevue Hospital—new southern wing and garage
 Community Hospital—Clinic quarters
 Memorial Hospital—purchase of two neighboring houses
 Metropolitan Hospital—conversion of the 88th Street Police Station into a clinic and dispensary
 New York Polyclinic Hospital—purchase of a neighboring dwelling and conversion of two floors of the present nurses' building for the use of patients.
 New York Skin and Cancer Hospital—purchase of a neighboring house which has been utilized primarily for its large skin clinic.

Convalescent Home

St. Luke's Hospital—The Trustees have opened a new home. This welcome addition to the field has increased the existing facilities quantitatively as well as qualitatively.

Projected New Developments

New York Hospital jointly with the Medical School of Cornell University have acquired the property on the East River at 68th Street where a new medical centre will be built.

New York Skin and Cancer Hospital has purchased the plot between 106th and 107th Streets on Fifth Avenue facing Central Park and will build a modern hospital there in the near future.

Impending campaigns for building funds are those for the Lebanon Hospital (\$2,500,000).

Methodist Episcopal Hospital (\$1,000,000).

Lenox Hill Hospital (\$3,000,000).

Gifts and Bequests

Gifts in money made to Hospitals for various purposes during the year amounted to \$1,850,000 including the following:

\$300,000 to the Memorial Hospital by Mr. John D. Rockefeller, Jr.

\$250,000 to the Memorial Hospital for radium by Mr. Edward S. Harkness.

\$200,000 to the Neurological Institute for research work in encephalitis lethargica.

\$9,193,498 in bequests went to member hospitals of the United Hospital Fund. The largest share went to St. Luke's Hospital. Mt. Sinai Hospital received thirteen bequests.

New Nurses' Homes

Mount Sinai Hospital

Bellevue Hospital—two new wings, including swimming pool and gymnasium

Memorial Hospital—five-story home

Montefiore Hospital—110 beds added to home

Brownsville and East New York Hospital

Staten Island Hospital

New Medical Centre--

a. Presbyterian Hospital

b. Neurological Institute

St. John's Hospital

Lincoln Hospital—taken over by the city two years ago.

MUNICIPAL HOSPITALS

Among the matters to receive widespread public attention is the proposed consolidation in one department of the municipal hospitals comprising about 40 per cent. of the hospital beds of the City. The municipal hospitals have been under the jurisdiction of three departments, namely, the Department of Public Welfare, Bellevue and Allied Hospitals and the Department of Health.

The above activities, necessarily reported briefly, summarily indicate that the Hospital Information and Service Bureau of the United Hospital Fund is rendering increasingly varied and valuable service to the hospitals of the community and to the public at large.

RECENT ACCESSIONS TO THE LIBRARY

American (The) text-book of prosthetic dentistry. 5. ed. Ed. by C. R. Turner & L. P. Anthony.

Phil., Lea, 1928. 772 p.

Antognetti, L. & Muggia, A. Le albuminurie benigne.

Milano, Soc. an istituto edit. scien., 1929 [1928]. 289 p.

Barnhill, J. F. The nose, throat and ear.

N. Y., Appleton, 1928. 604 p.

Bogert, L. J. Fundamentals of chemistry.

2. ed. Phil., Saunders, 1928. 345 p.

Braun, A. Sinus thrombophlebitis.

N. Y., Hoeber, [1928]. 269 p.

Brown, A. S. [et al.] The physician throughout the ages. v. 1.

N. Y., Capehart-Brown, 1928. 848 p.

Clark, W. M. The determination of hydrogen ions.

3. ed. Balt., Williams, 1928. 717 p.

Dennie, C. C. Syphilis; acquired and heredosyphilis.

N. Y., Harper, 1928. 304 p.

Foote, J. S. Bone as a measure of development.

Omaha, Douglas, 1928. 182 p.

Freudenthal, P. Experimental rickets.

Copenhagen, Levin, 1927. 235 p.

Gesell, A. Infancy and human growth.

N. Y., Macmillan, 1928. 418 p.

Goodman, H. Story of electricity and a chronology of electricity and electro-therapeutics.

N. Y., Medical Life Press 1928. 62 p.

Harrow, B. Glands in health and disease.

[2. ed.] N. Y., Dutton, [1928]. 275 p.

Hollander, B. Methods and uses of hypnosis & self-hypnosis.

N. Y., Macmillan, [1928]. 191 p.

Imre, J. Lidplastik und plastische Operationen anderer Weichteile des Gesichts.

Budapest, "Studium" verlag, [1928]. 95 p.

Jones, F. W. & Porteus, S. D. The matrix of the mind.

Honolulu, Univ. of Hawaii, 1928. 457 p.

- Leibovici, R. Etude chirurgicale des gangrènes juvéniles par artérites chroniques non syphilitiques.
Paris, Doin, 1928. 231 p.
- Lennox, W. G. & Cobb, S. Epilepsy.
Balt., Williams, 1928. 197 p.
- New York tuberculosis and health association. Criteria for the classification & diagnosis of heart disease.
N. Y., Hoeber, 1928. 92 p.
- Ogilvie, W. H. Recent advances in surgery.
Phil., Blakiston, 1928. 461 p.
- Orban, B. Dental histology and embryology.
Chic., Rogers, [1928]. 223 p.
- Orrin, H. C. Fascial grafting in principle and practice.
Edinb., Oliver, 1928. 92 p.
- Pearson, W. J. & Wyllie, W. G. Recent advances in diseases of children.
Lond., Churchill, 1928. 593 p.
- Policard, A. Précis d'histologie physiologique.
2. ed. Paris, Doin, 1928. 923 p.
- Posner, J. J. Minor oral surgery.
Phil., Patterson, 1928. 106 p.
- Ramadier, J. La syphilis auriculaire; oreille et nerf acoustique.
Paris, Doin, 1928. 173 p.
- Rassenfosse, A. & Gueben, G. Des alchimistes aux briseurs d'atomes.
Paris, Doin, 1928. 184 p.
- Retterer, E. Evolution du testicule et du pancréas après la greffe ou la résection des conduits excréteurs.
Paris, Doin, 1928. 119 p.
- Rutherford, C. W. The eye.
N. Y., Appleton, 1928. 404 p.
- Schultzer, P. Lyset og experimentel rachitis.
Copenhagen, Levin, 1927. 217 p.
- Transactions of the annual meeting of the American bronchoscopic society.
1927.
- Transactions of the College of physicians of Philadelphia. 1927.
- Veil, P. & Codina-Altés, J. Traité d'électrocardiographie clinique.
Paris, Gaston, 1928. 447 p.
- Voronoff, S. The conquest of life.
N. Y., Brentano, 1928. 200 p.
- White, W. A. Lectures in psychiatry.
N. Y., Nervous and mental dis. pub. co., 1928. 167 p.
- Willis, H. S. Laboratory diagnosis and experimental methods in tuberculosis.
Springfield, Ill., Thomas, 1928. 330 p.

PROCEEDINGS OF ACADEMY MEETINGS

OCTOBER

SPECIAL MEETING

Monday Evening, October 1, at 8:30 o'clock

I. ADDRESS

The doctor—trainer or healer, George E. Vincent, President, Rockefeller Foundation

II. THE WESLEY M. CARPENTER LECTURE

The pathology of the aging process, Aldred S. Warthin, Professor of Pathology, University of Michigan

STATED MEETING

Thursday Evening, October 4, at 8:30 o'clock

ORDER

I. EXECUTIVE SESSION

Election of Fellows

II. PAPERS OF THE EVENING

a. The pains, penalties and prohibitions of old age, Sir Farquhar Buzard, Professor of Medicine, Oxford (by invitation)

b. Menopausal and post-menopausal conditions in women, Benjamin P. Watson

c. The relation of disorders of ductless glands to senescence, William Engelbach, St. Louis (by invitation)

SPECIAL NOTICE

There will be no Stated Meeting of the Academy on October 18.

The next Stated Meeting will be that of November 1. The program will appear in the first November folder.

SECTION MEETINGS

SECTION OF DERMATOLOGY AND SYPHILIS

Wednesday Evening, October 3, at 7:15 o'clock

ORDER

I. PRESENTATION OF PATIENTS

Miscellaneous cases from various clinics

II. DISCUSSION

III. EXECUTIVE SESSION

Examination of cases is limited to members and their invited guests.

Attention is called to the change of date and hour of meeting.

The November meeting of the Section will be held on Wednesday, November 7, instead of Tuesday, November 6, as scheduled.

SECTION OF SURGERY

Friday Evening, October 5, at 8:30 o'clock

ORDER

I. PAPERS OF THE EVENING

a. Osteomalacia and Paget's disease, Edwin Allen Locke, Harvard University (by invitation)

SECTION OF OTOTOLOGY

Friday Evening, October 19, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. PRESENTATION OF CASES
 - a. Chronic mastoiditis and labyrinthitis, following gunshot wound of the ear; operation, recovery
 - b. Cerebellar abscess, sinus thrombosis; operation, recovery, John McCoy
- III. PAPER OF THE EVENING
Pathology of the ear in meningitis (illustrated by lantern slides),
S. J. Crowe, Johns Hopkins Hospital (by invitation)
Discussion opened by Wells P. Eagleton, Edward B. Dench
- IV. GENERAL DISCUSSION
- V. EXECUTIVE SESSION

SECTION OF OBSTETRICS AND GYNECOLOGY

Tuesday Evening, October 23, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. PRESENTATION OF CASES
 - a. Abdominal lithopedion, Sophia Kleegman (by invitation)
Discussion by Frederick C. Holden
 - b. Rectal implantation of ureters for inoperable vesico-vaginal fistula,
Henry Dawson Furniss
Discussion by Edwin Beer, Edward L. Keyes, Herman Lorber
(by invitation)
- III. PAPERS OF THE EVENING
 - a. Acute appendicitis and acute initial salpingitis: A differential point,
James V. Ricci (by invitation)
Discussion by Edward W. Pinkham
 - b. The mechanism of labor, Abraham J. Rongy
Discussion by George L. Brodhead, Everett M. Hawks, Edward C. Lyon, Jr.
- IV. GENERAL DISCUSSION
- V. EXECUTIVE SESSION

SECTION OF LARYNGOLOGY AND RHINOLOGY

Wednesday Evening, October 24, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. PRESENTATION OF PATIENTS
 - a. Carcinoma of orbit and ethmoid removed by surgical diathermy,
Mervin C. Myerson
 - b. Case for diagnosis, Francis W. White

III. PRESENTATION OF INSTRUMENTS

- a. New type of needle for intro-nasal suturing, John M. Loré
- b. An improved method in bronchoscopic lighting applied to Jackson type of instruments, C. J. Imperatori

IV. PAPER OF THE EVENING

The prevention of nasal deformities following submucous resection of the nasal septum, W. W. Carter

Discussion, Lee M. Hurd, Wesley C. Bowers, Francis W. White

V. GENERAL DISCUSSION

VI. EXECUTIVE SESSION

SECTION OF HISTORICAL AND CULTURAL MEDICINE

Friday Evening, October 26, at 8:30 o'clock

ORDER

I. READING OF THE MINUTES

II. PAPERS OF THE EVENING

- a. Three curious Vermont epitaphs, Harris A. Houghton
- b. Brief sketch of Valentine Mott, Louis F. Bishop, Jr. (by invitation)
- c. Medicine men of the American Indian, Harlow Brooks

NOTES

FELLOWS ELECTED OCTOBER 4, 1928

Cyril Barnett	316 West End Avenue
Sprague Carleton	121 East 60th Street
Eugene Seeley Coler.....	1088 Park Avenue
Clarence Ewald de La Chapelle.....	900 West End Avenue
Daniel Joseph Donovan.....	790 Riverside Drive
John Duff.....	34 Gramercy Park
Lew Henri Finch.....	188 Market Street, Amsterdam, N. Y.
George Winthrop Fish.....	8 East 68th Street
William Goldring.....	150 East 52nd Street
Le Grand Haven Hardy.....	30 East 40th Street
Edward Hoenig.....	530 West 142nd Street
Edward Hicks Hume.....	303 East 20th Street
Raphael Kurzrok.....	1555 Grand Concourse
Charles Lerner.....	5 East 53rd Street
Walter Gay Lough.....	485 Park Avenue
Gervais Ward McAuliffe.....	110 West 55th Street
Sigmund Mage.....	670 West End Avenue
M. Joseph Mandelbaum.....	125 West 72nd Street
Angelos E. Marcoglou.....	125 West 72nd Street
Orman Clarence Perkins.....	10 Schermerhorn Street, Brooklyn

Elias Alfred Reed.....	United States Customhouse, Bowling Green,
John Ross.....	33 East 68th Street
Rudolph Nicholas Schullinger.....	51 East 50th Street
Willis Morris Weeden.....	70 East 77th Street
Carnes Weeks.....	168 East 71st Street
John Franklyn White.....	156 North Main Street, Port Chester, N. Y.

AND TO ASSOCIATE FELLOWSHIP:

Clairette Papin Armstrong, B.A.....	114 East 71st Street
Nicholas Kopeloff, Ph.D.....	Psychiatric Institute, Ward's Island, N. Y.
Harry Beal Torrey, Ph.D.....	Edgehill Inn., Spuyten Duyvill

CORRECTION

The obituary of Dr. Robert Abbe, in Volume IV, p. 583, signed by Dr. Charles L. Dana, is not by Dr. Dana. His signature should follow the obituary on p. 584.

DONATIONS TO THE LIBRARY FUNDS

Donations and bequests are solicited by The New York Academy of Medicine for the maintenance and expansion of the Library.

A donation or bequest of \$5,000 or more will provide for a special library fund, the income of which may be used for the general purposes of the Library or restricted to the purchase of books and periodicals, as the donor or testator may indicate.

ANNOUNCEMENT

A simple luncheon is now being served on the sixth floor to the Academy staff.

The House Committee has agreed to have luncheons served in the reception room to Fellows of the Academy. Any Fellow desiring luncheon should notify the Academy telephone operator not later than 11 A. M.

DATES OF ACADEMY MEETINGS

STATED MEETINGS

1st and 3rd Thursdays.

SECTION MEETINGS

Dermatology and Syphilis, 1st Tuesday.

Surgery, 1st Friday.

Neurology and Psychiatry, 2nd Tuesday.

Pediatrics, 2nd Thursday.

Otology, 2nd Friday.

Ophthalmology, 3rd Monday.

Medicine, 3rd Tuesday.

Genito-Urinary Surgery, 3rd Wednesday.

Orthopedic Surgery, 3rd Friday.

Obstetrics and Gynecology, 4th Tuesday.

Laryngology and Rhinology, 4th Wednesday.

Historical and Cultural Medicine, 4th Friday of October, December, February and April.

TRUSTEES, COUNCIL AND COMMITTEE MEETINGS

Trustees, 4th Wednesday

Council, 4th Wednesday.

Committee on Admission, 1st Wednesday

Committee on Library, 2nd Tuesday.

Public Health Relations Committee, Mondays.

Committee on Medical Education, 2nd Thursday.

Committee on International Medical Relations, 3rd Wednesday.

DEATHS OF FELLOWS OF THE ACADEMY

WILLIAM NATHANIEL BERKELEY, M. D., 210 East 60th Street, New York City; graduated in medicine from the University of Virginia, Charlottesville, in 1891, and Bellevue Medical College, New York City, in 1896; elected a Fellow of the Academy April 3, 1902. Dr. Berkeley was a member of the Pathological Society; he died, October 23, 1928.

DONALD MUEHLENBERG CAMMANN, M.D., 1 West 54th Street, New York City; graduated in medicine from the College of Physicians and Surgeons, New York City, in 1879; elected a Fellow of the Academy April 5, 1888; died, October 13, 1928.

WILLIAM FRANK GREENE, M.D., 431 North Braddock Street, Winchester, Virginia; graduated in medicine from the College of Physicians and Surgeons, New York City, in 1878; elected a Fellow of the Academy January 2, 1890; died, October 17, 1928.

Inmates of this institution must have acquired the age of 65 before admission, with their health such as would not come under the heading of hospital care; that would mean they must be able to live the life of usual activity of a person of 65 and should give no indication of soon becoming helpless invalids and bedridden. These people remain in the home until their final exit, unless unmanageable dementia of old age or acute surgical conditions demand special institutional care.

This age of 65, say, to 80 or even over 90 gives a wonderful field for general observations. It is true that these people are not cared for and treated on a modern hospital basis, but more from the point of view of the old in their homes.

It so happens that this group is composed of women from various walks of life, so the observation is not taken from any one class; collected material and data on aged males is from various other sources.

There is one large and important group of old age which I have not had the chance to watch for any consecutive period of years and that is the old physically worn out labouring man. Of course I have had some of these individuals under my care from time to time but usually for some acute disease or some old age infirmity. Whereas, the other groups I have watched from year to year, observing the gradual failure with incidental disturbances.

I would like to ask you, or maybe, you prefer to ask me, *What is old age?* We all know the size of a piece of chalk, and we all know old age when we see it, but that is a long way from a definition.

A few years ago, I listened to a very interesting paper presented by one of our leading specialists; the title was "Sleep;" he told us that when he began to write he had not the least doubt but that he knew what sleep was, yet discovered that words failed him; reference works on the topic gave him jumbled and contradictory definitions forcing the author to work out one for himself which he pro-

ceeded to do. This is what now taxes my ingenuity and it is not so very easy; old infers many years. Youth looks upon 60 as very old, even finished with life; the child of 8 or 9 considers the guiding adult of 30 as a completed unit with nothing beyond. I am aware that this statement is simply a social or psychological observation and not quite germane to the medical view.

The question, "What is old age?" was put by me to a number of intelligent laymen and physicians to find what was their definition. The answers were variable and contradictory; most of them, if you will excuse slang, were full of holes. The simplest, therefore one of the best answers, was given me by an intelligent, able lawyer, a man in his 80th year.

Thinking a few moments, he answered. "It is a gradual deterioration of functions."

This coincided with the conception I entertained and seems to me the best general statement and least liable to destructive analysis.

We must have in mind, though, that gradual failure with time is one thing, and the deterioration of body functions and vitality due to disease producing a senility, is another, though results are similar if not quite the same. One frequently sees old age at say 30-40 due to inherited feebleness, sickness or a frail non-resisting childhood; vigorous youth early overstrained by heavy burdens, mental and physical, steps across the threshold into the waiting room of old age long before the allotted biblical years of honour or the mathematical time fixed by the insurance actuaries.

Years are not the only factor, and I shall have to refer to this later, yet if much water of the river of Time flows under the bridge, then surely the deterioration of old age will show itself. Let us *omit for a moment the pathological* conditions of aging and ask where is the beginning of the first so-called physiological aging.

We are told our body vigour and development runs to about the 30th year on the upward plane. Our mental force, about this time, reaches the point where it begins to bud and blossom in direct ratio to previous cultivation and quality of the soil. This premise I trust you will accept, for it is necessary to validate several conclusions which follow.

Now, what are the first indications of the beginning of physical aging? Or if you will, the beginning of deterioration?

I would like to give as my answer, that the "failure of the body readily to recuperate after pronounced physical fatigue, is the incipient sign of aging."

At the risk of being prolix, may I explain? A certain boy, in the vigour of youth, after prolonged physical fatigue, becomes very tired and overstrained. Then a period of rest follows, which usually includes food and sleep. Behold, the fatigue is gone, and he has again his vigour according to his normal make up for fresh exertion, and there remains no sign of strain. Naturally I am excluding strains and efforts which wreck one. The prize fighter in the ring, at the end of the fight, seems on the verge of collapse. But unless he receives permanent physical injuries, he, after a short rest and recuperation, returns to his normal.

Bring this closer home: professional men are subjected to many taxing fatiguing labours, mental and physical. We can all look back on periods of work which deprived us for one or two days of sleep and physical rest and frequently associated with mental anxiety. Our task once over, and a few hours' nap, a cold bath and something to eat, and we can do the next day's work with energy and pleasure, even ready again to undertake a new fatigue.

That is physical youth. But just as soon one notices that rest and food only partly restore us, and repeated

spells of recuperation are needed before our normal vigour seems to come again, that is not old age but it is a shadow, cast over vigour as a signal of a coming twilight.

Our laboratory workers report to us that a toxin is generated by muscle exertion and nerve energy which gives us the poison of tire, throwing a very interesting side-light on this question, but I do not remember reading whether it is the rapid elimination of the generated poison which allows full quick recuperation in youth or whether the poison of old age is a more powerful toxic agent. This is a laboratory problem.

Youth and early middle age will undergo shocks and surgical interference and be the pathological conditions not too grave, the surgeon able and thoughtful, we expect a quick rebound to normal. If the subject is past the point of rapid recuperation by rest and opportunity, his return is very slow and the recovery may leave him on a lower level of vitality for a long time.

At what age is this first change? When does a man begin to conserve his strength for fear it may give out and embarrass him? Figures are not easy to give, exceptions are so many we can easily place ourselves in a false light. Yet before 30 in a good, strong individual, this sign should not come, and many will go on to 40 or 45 years of age without realizing fatigue holds over. Yet I have observed that nearly all men and women by 40 begin, though unconsciously maybe, to consider the cost of fatigue.

Thus to paraphrase, *slow recuperation after a strain* is the first signal of physical deterioration on the road with the sign post pointing to old age.

To give an opinion of the first signs of beginning mental deterioration, the task is far more complicated, there are many intricacies of temperament, the way the mind has been developed and the stimuli under which the individual lives. There may be a parallel between the mental and physical, yet physical is more concrete, the mental is a far more subtle point and harder to fix. I think I am correct

in asserting that the beginning of physical deterioration takes place far sooner than the weakening of the mental faculties. Moreover the curve of mental failure is far more gradual than the physical.

There are all sorts of individual exceptions. Yet the mental vigour, thought and power stimulates the mind to work well on through the years and many are they whose mental acumen is of high order and these continue to do good work well on into advanced old age. In fact, the comparison with similar conditions of physical strength gives the advantage all on the side of mentality. Not only does this hold true in outstanding cases but average individuals under average conditions fail sooner in body than in mind.

In the group of old age I have specially watched for some years, I would estimate that 95 per cent. have retained their individual mental quality to a far better degree than the physical, and the majority of this group came from the plane of life in which the mental side was not the predominating one, and the physical strain under which their earlier lives were spent not excessive.

This picture I have been trying to sketch to you is an outline of the transition after full development to *insidious deterioration*, leading slowly but surely to senility assuming a working physiology appropriated to the years.

Alas, this type of gradual physiological failure is a distinct minority among the aged. I watched a few examples of this group during the closing years of their lives. My years are too few to have seen the whole panorama. I recall one normal deterioration, the picture of which, I think, will interest you.

It is a history of fatigue, then fatigue without any recuperation, so much so that with the slightest physical effort there was the dread of prolonged exhaustion. The mind had given up interest in most things except a gentle concentration on small personal matters. This patient was what one might call well. She was nearly 90, of a

calm disposition. The body was well nourished, not stout, though the musculature was soft; the skeleton not distorted by weakness: proper nourishment was taken with relish and digested; the intestines carried on their work, the urine examination was negative; bladder control good and the blood pressure not high; arteries to the tactile sense not thickened; the heart sounds clear, rather feeble but regular, the apex beat was faint; a fair chest expansion; the skin not shrivelled nor dry, the hearing good and with glasses could read the daily paper and Bible with reasonable interest. The speech was clear and the language complete. I cared for this patient several years and watched the picture change, or I might say, imperceptibly fade.

On one of my visits I found her in bed, reading her morning paper. She was usually up by breakfast-time, dressed and seated in her rocking-chair or busy about her room. I asked her if she felt ill or had any distress. "No," she said, "I am only lazy. I am going to get up after luncheon," which she did. After a few such days she felt disinclined to leave her bed. She read less, crocheted a little but it tired her. She was responsive in conversation on simple topics, then she failed to remember me from one visit to another, though she talked to her nurse about minor matters intelligently, if roused; ate very little, fluids only, and slept most of her time quietly. Reading and knitting were abandoned, breathing became more shallow; pulse soft and very small, and one evening she fell asleep and in that sleep, without a twitch, gurgle or groan, she went. This closing picture extended over a period of about 3 weeks. This story is the most perfect example I have ever witnessed of a human being passing into old age and leaving this earth by simple deterioration or gradual failure of physiological functions. We might call it the physiological *Nirvana*. The death certificate was signed, gradual transition in feeble old age.

Few others I watched have passed on to the beyond in a similar manner, but they did have some distinct visible

pathological change, maybe not very distressing, yet enough to explain clinically why they died. Such blessed and peaceful endings of life are not what we usually have to handle. To very few does the end come like the one horse chaise. All our health departments and insurance tables gives us data which force upon us quite another picture; most of mankind has a far rougher road of health to travel and must fight to prolong life, while we try to ameliorate his lot.

In advancing years the gradual unbalanced chemistry and an unbalanced organic function starts us on the way to feebleness and incapacity for work and progress.

The outstanding ravishing damage and results are found in the body circulation. In fact, 67 per cent. or more, close to three-fourths of the terminations after middle life are brought about through circulatory disturbance, leaving little more than 30 per cent. for growths, injuries and acute infections. I find reviewers on this subject laying great stress on this high percentage as due to our strain of living in our day under great pressure and activities with worries. For my part, I doubt this statement. We have no health department statistics of ancient times or middle ages; in fact only recently has modern efficiency established such. Yet the fragmentary accounts and descriptions of death many years ago leave the impression, even if not percentage figures, that failure of circulation through mechanical strain or system poison was as prominent then as now. All the old medical works, telling the tale of dissolution of those who were aged, give the picture of circulatory trouble, and intimate biographies in history tell the tale of dyspnoea, dropsy tapping, kidney failure, monoplegia, hemiplegia, inarticulate murmurings, coma. Human nature is always the same. Infections, body strains, mental effort in ages past, have all had the same results as to-day. It is true that we have better scientific understanding at our disposal, infant mortality has been greatly reduced by medical management, public education, also sanitation and specifics against contagion and infection.

All these have done wonders to check the ravishes of disease and control epidemics, saving working hours and days for the nation's man power, reducing economic waste and prolonging the life of the individual, also by our better chemical biological data, checking and controlling body suffering; especially must be added the great strides in surgery, accomplishing to-day results which even 40 years ago would have been called miracles.

This paragraph may be a digression but I had to give it as it is a memorandum of the key note of our modern medicine.

Arts and science and state have been great factors in prolonging the span of life. In fact, I think it is nearly two years which has been added in recent time to terminal age, which youth looks upon as useless. But that is not the point; it means all along the line of life many are conserved, mankind made more comfortable and the coefficient of labour more productive for state and family.

If nearly three quarters of individuals reaching advanced years are suffering from circulatory distress, let us consider some of the subdivisions. As I mentioned at the outset, you will have special articles on these problems, but I am not exempt from touching them.

Our heart begins to pump in our very earliest state. If no acute toxic or physical force injures its functioning, it carries on the allotted task until slowly many phased deterioration destroys its power. Such a simple life work of the heart is unusual and rare, but by clinical observation we think we do see it at times.

The permanent heart damage in early youth plays no great part in old age; such cases (the endocardial and pericardial infections and mechanical damages) always preclude advanced years. It is quite true individuals with permanently damaged hearts, much to our surprise, carry on an active life for some time, even well on into adult age. I never found such an antecedent story in those who reached the real old age. You all know what a tremen-

dous amount of work the heart is prepared for and can carry out under stress without permanent damage. Yet such strain must not be too long nor too often. The healthy trained athletic individual will find athletic work health producing and heart force strengthened; other things being equal, such an organ in old age will do its work satisfactorily. Overtaxed hearts with a positive hypertrophy and following dilation, do not run into old age. The strong man of the circus, the heavy weight acrobat develop a heart hypertrophy which breaks circulatory balance fairly early. Two or three of such cases have come under my care when they had reached a moderate old age or middle life, all possible care and rest could not restore a circulatory balance. Until last year I had rather a unique example a long time under observation which though paradoxical bears on this very point.

A woman in childhood, due to infantile paralysis, lost the use of both legs. You have seen in homes for incurables how children in this group rapidly adjust themselves by using their arms for locomotion and carry the body inverted; they rapidly develop arm and shoulder muscles beyond the usual; in time these cases when older and the trunk heavier find the tax to drag and lift the body is considerably greater. The secondary heart tax and consequent hypertrophy can well be imagined. This woman referred to, when first coming under my care, was about 70 and enjoyed general good health. Her life was an indoor existence for the most part, consisting of occasionally going out in a wheel chair; locomotion at home was most remarkable; her body was fairly heavy, much of the time she sat on the floor and got about by humps and jerks; with astonishing arm strength she lifted herself on chairs and bed; last summer she died, over 90. As I said above, her health was very good and her functions carried on satisfactorily normal. But needless to say, this tremendous muscular effort of hoisting and dragging which I often gretched with amazement (for it was an exertion which also had given me dyspnoea and vertigo), produced in infection oversized heart. This hypertrophy by daily use she

seemed to tolerate; she needed it and it was not accompanied by any signs of cardiac distress. The last few years though, she was obliged to curtail her physical activities to a minimum. Dyspnoea became marked; even at rest she was not quite comfortable; pulmonary stasis was the terminal cause of death at 90. This stands as an example of a heart overworked for a long number of years, yet with a toleration and balance allowing body comfort way beyond the expected. I attribute this to the fact that the heart was taxed daily; it was kept in practice, so to speak; there were not weeks or months during which the minimum was required, and then great effort demanded. Not many of us over 60, living our ordinary life, can chin on a horizontal bar more than 2 or 3 times without feeling the tax. Yet here was a woman who every day had done that type of exercise. Citing this case, do not accuse me of a paradox if I state prolonged over exertion and strain early producing a heart damage, precludes old age.

The next phase of heart accident I would like to mention is the serious acute dilatation. This is not confined to old age as you know; in youth and middle life it is often the unrecognized cause of ill health and debility. In old age though, it is the push down the hill of life and a drop over the precipice. The type of acute dilatation in youth has often come under the care of medical men and many examples make them too familiar to dwell on them here at any length.

But two examples in strong contrast at the opposite ends of the rainbow of life I would like to narrate.

In old people it is a dangerous situation.

A gentleman of 87 at the time of his death had been under my care for some years. He was a wonderful example of a happy, well-preserved old man. His mental keenness and cheerfulness was quite remarkable; he enjoyed tremendously his physical exercise, though somewhat limited, and he was very keen about life in general. He took periods of rest during the day, was fond of read-

ing and smoking his pipe, the taste for which he had not lost. He had a summer house on the coast of Maine and took a short daily dip in the cold surf with great zest. His heart sounds were clear and there was no marked enlargement, systolic contractions fairly strong, there was very little thickening of his radial vessels. His blood pressure stood around 130. He was a well preserved man for his age, yet his co-efficient of safety was not great. He was going strong; one cold winter's day after his luncheon down town he felt he would enjoy the bracing weather with the clear sky and the north wind, by walking home, a distance little less than two miles; with a heavy fur coat for protection he started his sportive proposition. He reached home. I was sent for and found him feeble, exhausted, catching his breath with difficulty, slightly cyanotic, pulse very flat, systolic pressure 127, heart sounds feeble, hardly audible, apex beat missing. The picture was one of cardiac weakness and stretching after over-exercise in old age. The end of about a month with great care and caution saw some improvement; he could sit in his arm chair, regained a little good cheer. He lost the enjoyment of tobacco, but in a few weeks his heart gave out. This is an example of fatal dilatation in old age.

Many of them are of the acute type and show no come-back and death is almost instantaneous, suspicious of a true angina. I will have occasion to refer to this type again under "Control of old age," for it is an example to warn physicians and friends of the aged to be very slow with regard to advising exercise for the old as a tone builder, even though you do not suspect a serious cardiac condition. As a contrast of this case of old age dilatation, at the risk of going outside of the scope of this paper I would like to tell you of a little girl of between three and four years of age, from birth a patient of mine. A healthy, well-nourished cheerful specimen of childhood and fully up to the activities of her age. The summer home was in the hills and the house situated quite high with a sharp declivity at the back going down to the stable, where there was a new pony just bought for the older children. The

children in their excitement and interest, all ran down the steep zig-zag path at the back of the house, taking their little sister of three and a half with them, to give her a treat. Then they all came up the hill with childlike speed, dragging the little 3-year-old with them, urging her to keep pace. At the house, they found a neighbor, another little child, had just arrived. In their great excitement over the new pony, they took the visitor down the steep hill to the stable, little 3-year-old, energetic sport, went along, then in a short space of time they clambered up this almost fatal path. The little one at high speed was dragged along toward the end, reaching the top in collapse, slightly cyanotic about the lips and fingers, gasping for breath. The mother, of course, was greatly alarmed. The child was under my immediate care for about 3 months in bed. Heart sounds hardly perceptible, soft murmur, apex not felt, by percussion the border was well outside the three-age limit. When the child rested quietly on her pillows, she was quite comfortable and cheerful, yet the least effort of sitting up or a little too much excitement brought on cyanosis and dyspnoea. The end of the story, the child made a very good recovery, the mother very wisely for a year or more allowed only the gentlest type of physical activities. This little child is now a woman of 25 and more, strong, well built, good horse woman, tennis player, and more than average physical activity, and mentally very keen and balanced. The reason I cite this child's case is to accentuate the situation in old age. With the old age type they are pushed to the edge of the precipice and over, whereas in youth, especially during the growing period, we can expect repair if handled early, wisely and for a long time. There are lots of milder cases in children; also milder cases in old age which we can patch up to run another lap.

Precordial pains play a great part in the distress of older people, especially men from the 5th decade, say up to the 70th year. This term "precordial pain" covers a multitude of unknown and unrecognized conditions. Recent years some good groupings and classifications have

on this field. This work is to be desired and in time will receive attention. Yet senile patients are not good subjects to work with, for as I said before, most of old age is pathologically complicated and only a small percent simple.

Certain sources of poison may be classed as self-evident. The first of these, the intestinal tract and the gastric digestion. With most old people the stomach does better work than the intestines, from the medical point of view; it is quite astonishing to see the meals and variety of foods and quantity the old may eat and if they have teeth or substitutes, can get away with it without signs of gastric distress. But I do not believe that 3 per cent. of old age, say between 70 and 90, have an intestinal tract which functions anywhere near the normal. The colon is sluggish, the small intestines give symptoms of distress, there is chronic inadequate elimination, constipation is moderate or marked, requiring constant attention. The ills following in the wake you all know, you have the catalogue in your hand with all the numbered pictures of human discomfort. In babyhood, youth and middle life, intestinal misbehaviour destroys the peace of mind and body interfering with work and pleasure. You have in youth and middle life a background, an energy on the part of the patient to help you bring these subjects back to normal. But in old age the task is not so easy, the functions are impaired and though moderate errors are corrected there is no reserve power; diet in old age helps but you will find old people unwilling to change their foods, the collaborating influence of exercise you cannot carry out, for the old do not want to exercise more than their habit, if by pressure you force it upon them, chances are you do damage. Massage must be very gentle. I had an old lady once who received active osteopathic treatment massage and she was nearly two weeks in bed recuperating. Colon irrigation in many cases has serious drawbacks producing annoying weakness and even syncope. Of course, all these stumbling stones are not in every path, but you are handicapped and each case has its own problem. You may gently and

wisely work out an idea which promises something, and receive your reward, yet after all is said and done, cathartics of one kind or another will be your sheet anchor, it is a shame to confess it.

Nearly all old people have found some cathartic which they find agrees with them and the wise man will listen to the praises of a pink, yellow or green pill or a brown liquid the patient treasures. If you find said pill or liquid does its work, find out the ingredients, use and hold on to it as long as it works. This does not sound like intellectual therapeutics, yet it often will prove more to the patient's advantage if you follow it rather than branch into some preconceived book knowledge of your own.

If the aged, specially the female, tells of daily regular elimination, beware, she is deceiving you, for the feeble old will be perfectly satisfied with the semblance of an accomplished reality, and you will find a stored up reserve requiring hours if not days of labour on your part or the nurse's to overcome.

The serious impaction, especially above the sigmoid, extending up as far as the transverse, is a dangerous and important situation in old people. I have had to deal with many of them and death was near, at times the mechanical problem proved fatal even with surgical assistance.

One marked instance I may cite. An old lady over 80, good appetite and digestion, physically very inactive, but the intestinal tract had behaved fairly well for years with the help of an intelligent nurse. A complication arose, elimination became poor, the descending colon was fuller than stronger medication and the usual irrigation could relieve. A mass lying in the line of the colon just above the sigmoid flexure was easily felt and gave one the impression of a moderate sized orange. The usual procedures from below were carried out with much caution, and the reward was very slight; the case was so desperate that the advice of the surgeon was asked. He felt the situation too precarious to allow any interference. A nurse,

very skilled in colonic irrigation and one experienced in the care of the feeble and the old had been working on this case and was almost ready to give up as the patient was becoming so weak, in fact the patient begged to be let alone to die in peace. We administered cardiac and general stimulants, and in the end, by this gentle method of placer mining methods and some light abdominal massage the obstruction was eliminated, the state of collapse cleared up, and the patient enjoyed again her usual health for some years. Forgive me if I am trite in reporting such a case, but it is an example of nearly fatal colon block in old age. Yet with patience and persistent endeavors a cure was obtained. In passing I would just like to mention that constipation in the aged often produces paradoxical diarrhœa.

Colitis in old age is not very frequent compared with middle life. It usually is the serious or watery type, less often the mucous variety and in most cases due to food errors and readily amenable to treatment; the bacterial and chronic involvement of the colon in my experience is rare in old people. Constipation or poor elimination through the whole intestinal tract is a dreaded foe at all times; it hastens old age and accentuates its feebleness.

You may recall the literature and reports a few years ago of the work done in an insane asylum at Trenton, N. J. The work was surgical and medical, carried out in reference to the colon on certain types of melancholia and dementia, especially as I remember a type occurring in old age. The cures were most spectacular. This seemed to me full of promise yet I realize how great must be the selective difficulty in this group of patients.

As hinted earlier, a colon which works well even with the advance of years is one of the best assets, other things being equal, for a tranquil old age; to put it more emphatically, it helps defer old age.

In this connection I would again refer to the increase of blood pressure, for an existing blood pressure with dis-

tressing symptoms is often relieved by treatment directed towards colon elimination alone.

In middle life the practitioner always seems to have it in mind, but in old age cases he is apt to overlook its importance, and persists in directing his efforts to the circulatory system per se. It is true the more advanced the change in the arteries and the other organs and the nearer the case approaches the true fibrosis, the less will be the benefits through colon management.

Oral infection goes hand in hand with the intestines as the next most important cause for old age misery. Tonsils and sinus trouble are not frequently met, yet at times the very aged do carry tonsils which demand active surgical treatment to relieve a positive chronic infection.

It is with some fear and trepidation I approach the problem of tooth and gum infection. This field of recent years has been done to death, so to speak, progressive fanatical wise men have gone way beyond the limits of judgment and common sense, and the sit pat over-conservative neglects the self evident foci and allow nefarious infection slowly to destroy bodily comfort and health. For the aged the management of these mouth infections is not always easy and requires a great deal of patience. In the first place the patients themselves hold back from any procedure demanding active surgical interference, and with reason, for old people have not the strength nor the will to undergo a troublesome, painful radical ordeal. Very seldom are the aged blessed with good sets of working natural teeth. Even if they have a fair number, the gums are apt to show considerable recedence and the tooth sockets are infected; the teeth soon become loose, and from the mechanical point of view alone, become a great nuisance. I have seen old people, while chewing, force a loose tooth so out of true that with their fingers they set it straight so as to go on eating. This, of course, is an absurdity and almost silly to tell, and needless to say, such a tooth is not long in residence. A further mechanical handicap is the poor grinding of the food and this is quite serious for ul-

toms and give the relief sought. In acute urgency, of course, large doses and energetic measures are indicated. Other heart drugs are employed under the usual circumstances. In the cerebral hemorrhage or intermittent claudication, morphine and chloral hydrate to my mind are par excellence and really the only drugs, for you know in these cerebral attacks the family excitement is pretty great, action is demanded and I have seen many a physician carried away and overdo his work.

A few words must be added in reference to the gland treatment which has come so much to the front. The stimulation of the endocrines in old age does become attenuated, failing in more or less direct ratio with the general deterioration.

Often we can establish a better activity by administration of the glandular products. The interlocking of the endocrine activities is such that the problem is not by any means easy to handle in spite of our recent advances. In old age the thyroid in small or graduated doses is one which does seem to work to the better establishing of the spirits and animation, a so-called tonic builder; sometimes the mixed or hormotones give very good results. As to transplanting, especially the popular simian testicular grafting I have no experience. Some reports lead one to doubt whether a worn chassis can stand the strain of a new powerful motor. I have already warned you, don't drive old age beyond the breaking point. If this procedure is applied to youth, jaded maybe, results might be beneficial, yet *I wonder*. Better balance *mind* with *body* for each *decade* of life and *care* for each decade.

One must walk quietly if he would travel far. "It is a most earnest thing to be alive in this world; to die is not sport for a man."

CARLYLE.

CLIMATE AND THE AGED

GERALD B. WEBB,

Colorado Springs

An English traveller, returning home from the United States, told his friends that he had seen no old people in this country; and added that he supposed they had all died chasing the dollar! Possibly there is a gesture of truth in his supposition, but on the other hand elderly Americans do not allow themselves to appear aged, especially the women. And they are not "sans teeth, sans eyes, sans taste, sans everything."

My theme is to touch on climate and the middle-aged and aged. Osler has stated that: "The starting point of all treatment is in the knowledge of the natural history of the disease." Age has been termed an atrophy. Cumming points out the withering of the capillaries, the attenuated blood, the enfeebled respiration and lessened oxidation, the failing of the excretory organs, and the loss of elasticity of the arterial system. In consequence of such atrophies, which include the skin, we have faulty assimilation, imperfect oxidation, and diminished power of resisting cold. Cumming claims that proper climate promotes comfort.

As a preliminary to my paper it will be necessary to dwell for a moment on the meaning of climate.

The word climate is derived from a Greek word '*klima*' which means an incline or slanting position. The term was first employed to indicate a region considered with respect to its inclination towards the pole. Later it denoted the result of the oblique sun rays on the earth. We employ the word, weather, to denote the atmospheric conditions of a limited time, whereas climate is now employed to cover the atmospheric conditions recorded over a long period of time.

Climates may be marine, continental and mountain. Variations in climate are almost entirely due to the fact

¹ Delivered October 8, 1928.

that the axis of the earth is inclined at an angle of about 24 degrees to the plane of its orbit. At the vernal and autumnal equinoxes each hemisphere has exactly the same amount of daylight and darkness. After the vernal equinox, on June 21, the northern hemisphere gains in temperature, but the greatest degree of heat is not reached for some four weeks. The atmosphere is heated more by radiation from the earth's surface than by the sun passing through it, and it takes several weeks of summer for the land and water to obtain their maximum heat and to radiate it back to the atmosphere. It is therefore when the sun is departing southward again that the hottest days of summer are experienced.

On September 21, the autumnal equinox occurs, and on December 21 the sun is at its furthest journey south. This is termed the winter solstice from the fact that the sun appears to stand still and not journey in either direction. In the northern hemisphere the sun rays reach the earth at an inclination passing through the greatest thickness of air and the hours of sunshine are short. The maximum cold we experience comes about four weeks after the winter solstice when an increasing amount of heat arrives from the sun and the amount received by the earth equals the amount lost by radiation.

Factors which are also important in determining climate, are land and water. Water takes up heat more slowly and gives it up more slowly than any other substance. The land takes up heat rapidly, in comparison, and gives up heat rapidly. The vast tract of land which constitutes our continent explains the extremes we experience in temperatures. It is considered that the extreme range of annual temperature results in the development of a strong race. It has been found by Huntington that the totality of human annual energy was greater for the northern than for the southern states.

Marine and ocean climates are known to be more equal; the large bodies of water equalize temperature, moisture and winds. Coast climate is less equable than in-

land, being disturbed by the heat radiation from land just noted. Inland climates are usually drier than coast, but vary more in temperature. In higher altitudes there is lessened proteid metabolism, but increase in activity of circulation and respiration.

Age is important in determining the suitability of climates. The young appear to thrive best in colder climates or climates having variations of temperature, and do not thrive in tropical climates.

Old people on the other hand suffer from temperature extremes and do better in warm than in cold climates. Their vitality being lower, cold weather depresses, whereas moderate warmth stimulates (Americana).

Perhaps I was selected to speak to you tonight on 'Climate and the Aged' because I live in Colorado, a state of moderate and high altitudes, to which physicians do not direct their aged patients. Possibly the reason was that I would not be partisan to one, more than to the other, of the states—California and Florida—to which such patients are apt to be directed.

However, I have collected a few facts, connected with a recent expedition of the aged to Colorado, which make me feel that at certain periods of the year altitudes may not be forbidden.

Two weeks ago the G.A.R. held a reunion in Denver which has an altitude of nearly a mile above sea level. Of some 13,700 veterans, drawing pensions, 11,000 attended the meeting. The average age of those in attendance was 82. Of the 11,000 attending 8,000 marched ten to twelve blocks. Some of the extreme ages of members attending are of interest. One member was 103 years of age, two were 97, one was 96. The youngest men, of which there were ten, were 79. At a similar reunion in Boston a few years ago there occurred five deaths, out of 16,000 attending veterans. During the last year there were 6,200 deaths among the membership. At the Denver meeting a large number motored up Lookout Mountain,

some 9,600 feet, and a large number came to Colorado Springs to motor up Pike's Peak 14,000 feet. During this reunion a few men were taken ill, but as far as I have been able to determine possibly only one died in Colorado.

My informant from Pennsylvania, aged 83, was returning home, and was going to tell his medical friends that they knew nothing about climate and that their anticipations of disaster which would attend this reunion were incorrect!

In my anxiety to present you something of value in regard to climate and the aged I consulted two of my valued friends in the American Climatological and Clinical Society—Henry Sewall and Carroll Edson. Sewall was of the opinion that the matter depended largely on what Claude Bernard has described as the 'internal environment.' Edson was kind enough to loan me a copy of *Verhandlungen der klimatologischen Tagung in Davos, 1925*. It is evident from this volume that the questions of climate are more thoroughly studied in Europe than they are in this country, yet positive facts which have been determined appear to be scant. Both Sewall and Edson feel that there is need for much scientific research in the matter of climate. Colorado physicians have found that cardio-renal patients, who are nearing the threshold of a break, may prolong their lives and live in greater comfort in such climates as those of S. California, Florida or Honolulu. Seeing many of these aged people, when on a visit to San Diego a few years ago, I asked a medical friend how long they survived there. The answer came that many died, but they still kept walking around!

Claude Bernard about 1870 emphasized the physico-chemical conditions of what he termed the inner environment (*milieu interieur*).

"In the outer cosmic environment, variations of temperature create the seasons which are characterized only by variations in the behaviour of animal and vegetable life on the surface of the earth. These variations take place

only because the inner environment or organic atmosphere of plants and certain animals remains in equilibrium with the outer atmosphere. The chemical composition of the cosmic or outer environment is constant and simple. The chemical conditions of the inner or organic environment are much more complex. The same individual is unlike himself at some periods in his evolution: this leads to differences connected with age. The human machine is the more perfect the better it defends itself from penetration by the influences of the outer environment; as the organism grows old and enfeebled, it becomes more sensitive to the outer influences of cold, heat, humidity, and in general to all other climatic influences."

"Physiologists and physicians must never forget that a living being is an organism with its own individuality."

"Habit is another condition potent in changing organisms."

In spite of our great advances in blood chemistry we probably do not yet fully understand this 'inner environment.'

Claude Bernard did not believe, in general, in the value of statistics. He wrote: "But physicians have nothing to do with what is called the Law of Large Numbers, a law which according to a great mathematician's expression, is always true in general and false in particular."

This doctrine is especially encouraging to one who is unable to present you with statistics in regard to climate and the aged.

Possibly no greater medical mind than that of Benjamin Franklin has originated on this continent. Franklin wrote, "he is the best doctor who knows the worthlessness of the most medicines."

To Franklin we owe the idea of the contagion of colds; the doctrine of fresh air, the great value of the air bath, and bi-focal lenses. Air bathing is too much neglected.

From Leonard Hill's writings the following knowledge is culled:

While infant mortality has been halved in the last few decades nothing has been done to extend the expectation of life of late middle age in our manufacturing cities.

The respiratory mucous membrane is, in outdoor life, far more thoroughly irrigated with arterial blood and washed with secretion and thus defended from infection. The high cooling power of air out of doors has to be made good by a greater flow of arterial blood through the parts of the face and the mucous membrane of the nose and its sinuses, and this surface is kept taut and the air-way free.

Congestion of these parts in stagnant warm atmosphere causes stuffy feelings and headaches. The want of adequate circulation and lymph flow and the evaporation from the respiratory mucous membrane must be conducive to catarrhal disease and phthisis. Middle-aged cotton spinners have a high death rate from respiratory diseases.

The native students of Singapore have a daily metabolism not equal to half that of an English student.

In regard to the benefits to be derived from sunlight, Hill states that the longest ultra-violet rays, and visible rays, penetrate to the cutaneous blood and warm it—even heating it to 47° C. The red rays penetrate deeper and reaching the joints and muscles warm these—hence the possibility of value in controlled sun bathing to those suffering from arthritis.

Window glass, clothing and smoke pollution screen off almost all ultra-violet radiation from our citizens in winter.

The sky shine gives much more ultra violet radiation than the direct sun (Dorno).

King Brown divides climates into: General Climate, Local Climate and Private Climate. The local climate of cities is handicapped by the collection of buildings interfering with free circulation of the air. This results in a

general lowering of the vitality. Atmospheric pollution of cities due to smoke and dust is also a serious drawback to health. Pure carbon is not serious, but smoke contains tar and sulphur acids, which are. Soot falling per square mile in Glasgow is 820 tons, Leeds—220, London—259 per square mile per annum.

L. Williams has likened a bracing climate, such as we have in Colorado, to champagne and a relaxing climate like that of southern states, to nepenthe. The latter he states spoils the appetite and renders one lethargic, results which are good for the aged.

Roddis and others have found that in the tropics the blood pressure of northern whites is from 10 to 15 mm. lower than in temperate climes. Mukherjee has determined that the basal metabolism is distinctly lower in the tropics than in Europe.

Books on medical climatology were non-existent when Solly in 1897 first published his work and few have appeared in recent years.

Many loose statements are found in the literature regarding the virtues of climates, and as a professor once remarked, "those who generalize tell general lies."

Madison Taylor stresses the fact that the mature judgment and specialized capacities of men from 50 to 60 years of age demand preservation. Many of these are overtired and overworked and they need two breaks a year from routine. If possible they should be sent northwards to the mountains or coasts in summer and southwards to the semi-tropical climates in winter. Such men and women of middle age rebound slower from fatigue and often present evidence of pre-senility. The brain circulation becomes defective resulting in gloom, early waking and a sense of gathering misfortunes. Disraeli described the three ages of man, "youth a blunder, manhood a struggle, and old age regret."

Taylor quotes Franklin as saying "drive your business, don't let your business drive you." } One must teach optim-

ism to the middle aged and when possible give them the joy of sunny climes in winter. The optimism of Brown-ing's may be of help to some.

"Grow old along with me, the best is yet to be
The last of life for which the first was made."

And Cicero's 'De Senectute' is encouraging to the gloom of age, pointing out that it should be considered a joy to have lost the appetites of youth.

Some family strains appear to be endowed with a tendency to longevity, in other families there would seem to be an inheritance leading to such disease as Bright's, from which many of the members will die in middle age. In England Henry Jenkins died, in 1670, at the reputed age of 157. Many descendants have been traced and there has been a tendency in this family to reach to one hundred years.

Buffon wrote that "old age is only a prejudice, but for our arithmetic we would not know it; animals do not know it, it is only by our arithmetic that we judge otherwise."

The family pedigree should be studied and the southern climes should especially be prescribed for those who have an ancestry of short lived members.

Walter James writes that the expectation of life in women past 50 is greater than that of men, although many husbands frequently predict for their wives early death from pneumonias, as a result of their scant clothing. It is just such scant clothing that man needs introduced. Nothing can be more detrimental to health than the climate which men carry beneath their unhealthy garments. Many college students and schoolboys have already discarded hats, and we can at least hope that collars and coats will next disappear.

As James points out scant clothing leads to a training of the vaso-motor system and this results in speed and precision in the distribution and regulation of the body's blood supply and the prevention of local congestions.

James also states that conditions such as mal-adjustment to surroundings, including climate, dress, work and play, may be etiological factors in the development of arteriosclerosis, Bright's and other diseases. He quotes Bacon that "to be free minded and cheerfully disposed at times of meat, of sleep and of exercise, is one of the best precepts of long lasting."

It is natural that in searching the literature on climate in relation to the aged one should find valuable articles written by physicians in Southern California and in Florida.

Remondino, 38 years ago, read an excellent and comprehensive paper on "Longevity and Climate" before the California State Medical Society.

He quoted Hufeland as saying that "The nearer and truer we were to Mother Earth, and closer our intercourse with Nature, the closer we approach the source of eternal youth and health."

Remondino tells us that in China centenarism is considered a natural condition, ninety to one hundred years being the tenth division of the life of man, and known as "Age's Extremity."

He dwells on the fall of temperature of the atmosphere as being detrimental to the aged, and reminds us that King David in his old age was kept alive by the animal heat imparted to his body by sleeping with a Sunamite maiden (Homeopathy). The climate features of Southern California which benefit the aged are well described. The latitude gives warmth and the sea yields the tempering winds. The soil is warm and dry, the sun bright and warming, the weather clear and the temperature moderate. There are no extremes of heat and cold and there is nothing to interfere with the exercise of old people. Remondino points to the actual results and the cases of longevity. Bancroft, the "Historian of the Coast," noted that the early explorers were charmed by the beauty of the natives. The essayist finds much in common between

beauty and longevity. "The unwrinkled countenance, clear complexion and bright eye, the firm contour of limb and body, the active smooth and healthy skin are as essential to attain, and enjoy, old age as they are to the perfection of beauty."

Helen of Troy, Lais, Aspasia are mentioned as originating in island climates. Scopas found his ideal Venus on the island of Equina and the modern sculptor Canova found his ideal goddess in the island of Corsica. Lady Hamilton we remember also originated in an island climate.

Hufeland further writes: "Uniformity in the state of the atmosphere particularly in regard to heat, cold, gravity and lightness, contributes in a very considerable degree to the duration of life. Islands and peninsulas have been at all times the cradle of old age. In islands mankind always lives longer than in continents lying under the same degree of latitude. Thus men live longer in the islands of the Archipelago than in the neighbouring countries of Asia; in Cyprus longer than in Syria; in Formosa and Japan longer than in China; and in England and Denmark longer than in Germany."

Hufeland states that there are fewer aged people in Switzerland than in Scotland because the great and sudden temperature changes and the cold earth of Switzerland are unfavorable for the aged. Day is quoted by Remondino as noting that twice as many people past sixty died in December as in July and that the cold months, December, January, February and March combined, yielded half the deaths for the whole year.

Prof. S. D. Gross asked "Where is the paradise on earth where man may reach his three score years and ten, as promised, and do so without pain or suffering?" Remondino answered—Southern California.

Florida was known to the Spaniards in 1502. In 1513 Ponce de Leon, a Spanish poet, mystic and theologian—who had accompanied Columbus on his second voyage—

received a grant to discover and settle Bimini, which was a fabulous island believed to contain a marvelous fountain or spring, whose waters would restore old men to youth. De Leon arrived on the coast a day named in the calendar Pascua Florida, and it is probable that this determined the name of the state. He returned to Spain believing the peninsula to be an island. It may well be that his classical learning had warned him to beware of the fate of Tithonus. This mythical person was the son of Eos—the morning—who asked Zeus that the beautiful Tithonus might be allowed to live forever. The request was granted, but Eos forgot to ask for immortal youth. As a result of this neglect, Tithonus grew into a hideous old man, and his voice “flowed on unceasingly.” Fortunately Tithonus was later changed into a grasshopper, so that he is not responsible for the garrulity of the cricket.

Florida physicians do not claim that Ponce de Leon found the fountain of perpetual youth, but they do rightly claim the advantages of residence in their state, especially in winter, for the aging residents of the northern states.

Randall writes a most complete paper concerning “Factors of Longevity in the Semi-tropics.” He studied the residence of 1,280 men who lived to upwards of 100, and found that all except 65, lived in semi-tropical zones and were lacto-vegetarians. The reports of the United States Public Health Service are quoted, which relate that 48 per cent. of the deaths in people over 60 in the 40th parallel are due to pneumonia and 26 per cent. of all deaths at all ages in this zone are from respiratory diseases. In the semi-tropical zone only 5 per cent. of deaths in people over 60 are due to respiratory diseases. Randall explains this by stating that the mucus surfaces are less susceptible to infections where sudden wide temperature changes do not occur, and he relates that infantile paralysis is never epidemic in Florida but that it always appears to follow a cold wet season in the north.

Randall writes that in warm-blooded animals the age of complete physical development, multiplied by five, determines the life expectancy.

A horse maturing at five years should live to twenty-five years. A man matures at eighteen and should therefore live to ninety. In the semi-tropics less food is consumed and climate determines diet.

The shortest lived people, the Esquimos, live on animal food, the longest lived people, the Japanese, consume little animal food. Randall finds that the food requirements are twenty-five per cent. less in the semi-tropics than in the northern states.

Robinson, a physician who speaks from his own experience, states that: "Habit, climate and associations conspire to destroy the northern middle-age successful business or professional man, ten years before his time. Suppose this man anywhere between the age of fifty and fifty-five had formed the habit of leaving his business for three months each winter and coming south. For a stimulating climate he has substituted a mild and soothing one. Instead of his hard working friends at home he is surrounded by a lot of men as idle as himself. Lastly he has effectually broken the habit of work." Robinson is in favor of Florida and warns that visitors to his state should not return north until May, on account of the chilly weather of April.

But all southern climes of the United States have winter days, which are damp and chilly, when artificial heat is necessary and even furs are needed.

Were I asked to name the ideal climates for the aged in this hemisphere I should answer the southern island climates, especially Honolulu. The Hawaiian has no word for weather and the climate is never oppressively hot. The mean annual temperature is 74 degs. F. The difference between winter and summer temperatures is only a matter of 7 degs. F. The mean annual relative humidity is 72 per cent. The average rainfall 26 inches.

Compare this climate for a moment with that of a state such as Michigan.

In Michigan the temperature can vary from minus 35 degs. F. to 108 degs. F., although the relative humidity and rainfall average the same as in Honolulu.

As far as I can determine there is little difference in the matter of longevity in the different states of the union.

When all has been said regarding the advantages of southern climes for the middle-aged and aged, the fact remains that of the few millions of these people it is not a very high percentage who can avail themselves of winter change. The problem for the majority is how to obtain climatic advantages conducive to longevity without migration. In cities the local climate must be improved by means of proper building regulations and proper control of dust and smoke. Both in the country and in the city the personal climate must be better prescribed. The diversion of hobbies and the relaxation which comes with pursuits which do not pertain to business. Diet can be controlled. Hippocrates well said "*Si homo parum edit et parum bibit, nullum morbum hoc inducit.*" Environment is to a great degree controllable. My own experience leads me to believe that old people in general are better off in their own homes and associating with their life long friends. Many middle-aged and the aged mid-west farmers have tried to take root in California and many have been successful. On the other hand there are those whose only diversion is to pitch horseshoes and they are not invariably happy in their new surroundings. Loomis, however, before the American Climatological Association in 1888, did not believe that old people should stay home. Loomis stated that the aged stood travel and change well, resulting in fresh impulse and mature life.

In every state the physician can do much to promote longevity. It has been written that there is a great difference between a good doctor and a bad doctor, but very little difference between a good doctor and no doctor at

the question of the patient's criminal responsibility may arise.

6. Finally, old people may suffer from various psychotic disorders¹ which are independent of old age and benign in character, and which may and do occur at any period of life. The recognition of such is most important, as an error of this character might lead to most unfortunate situations for the physician as well as the patient.
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Keeping in mind the purposes of this Graduate Fortnight, I shall refrain from psychiatric technicalities as far as possible and endeavor to present some facts of practical and constructive value in the discussion of the subject.

Under the term *senile psychoses in psychiatry*, it is customary to include pre-senile psychoses and senile dementia, the former covering the fourth and fifth decades (from forty-five to sixty) and the latter after the age of sixty. This, of course, is an arbitrary distinction, as it is obvious that many persons become senile earlier than others. Further, it should be clearly understood that the term senile psychoses is only to be applied to those which are organic in character and where the psychotic symptoms are the expression of regressive changes in the tissues of the central nervous system.

Pre-senile psychoses, as the term implies, are not, in the strict sense, characteristic of old age. They are so classified, however, because the similar clinico-pathological changes may also occur during the senile period. Without going into technical details, they differ essentially from simple senile dementia, in that organic degenerative changes in the former are mostly confined to the vascular system of the brain, with consequent rapid and progressive symptomatology. The important symptoms may be summarized as headache, vertigo, transitory amnesic episodes, apoplectic attacks or convulsive phenomena of various sorts, etc. There are also degenerative tissue

changes, similar to those in senile dementia, but the dominant pathological process is arterio-sclerotic disorder.

The mental symptoms are also in keeping with the nature of the pathological process, namely sudden and profound lapses of memory, confusion, restlessness, disorientation, aphasic disorders and extreme physical disability. According to the location, variety and intensity of the lesions, several distinct entities have been described, such as Alzheimer's disease, presbyophrenia, arterio-sclerotic-senile psychoses, in all of which there occurs rapid destructive and degenerative changes in the vessels as well as the tissues of the brain.

With this very brief reference to the pre-senile psychoses, which do not come within the scope of this discussion, I shall now take up the consideration of senile dementia, the main topic of this paper.

SENILE DEMENTIA

Simple senile dementia, or deterioration, is the most familiar and typical type of senile psychosis, being a gradual, progressive deterioration and eventually terminating in profound mental reduction. Unlike so many other mental disorders, in simple senile dementia we find definite pathological changes, namely, diffuse atrophy of the brain substance, which stands in direct causal relationship to the symptoms.

Before going into a full discussion of senile dementia, it might be profitable to discuss briefly the condition of senility. While it is true that some regressive tissue changes often begin earlier, even in the forties and fifties, no appreciable mental variations appear usually until the fifth or sixth decade.

Everyone is familiar with the psychological changes in senility. One of the earliest traits is the undue conservatism, which as a rule expresses itself in the inability to assimilate new ideas. Later on, there develops an intolerance for new things; the so-called misoneism or Neo-

phobia. The old ideas and the old methods, for the old man, were far superior. He has no patience even for a reasonable discussion of new points of view. As there is no longer any future before him, he evinces a tendency to live in the past. "*They were giants in former days,*" and the men and methods of the present generation bear no comparison to those of his youth.

Another striking change is failure of memory; at first inability to recall names or words and, as the retentive memory becomes progressively impaired, there appears a marked failure of memory for recent events, with relatively intact recollection of remote experiences.

The general interest of a senile person gradually becomes narrow, and as a rule quite limited to his personal necessities. The conservatism of old age may express itself particularly in economic matters; as his productive abilities diminish he becomes unduly parsimonious, even to the point of penury, with a certain degree of suspicion and mistrust of those about him.

The average senile person is incapable of undertaking new endeavors, but may exhibit considerable proficiency in his accustomed tasks. It is scarcely necessary to refer to the physical infirmities of old age—general weakness, shuffling gait, muscular tremor and in-coordination, impaired functioning of bodily organs—which are quite in keeping with the psychological shortcomings just enumerated, and, further, these mental and physical disabilities are the direct expression of the diffuse atrophic and degenerative changes in the central nervous system.

Such, in brief, are the physical and psychic changes which one sees in a person who has attained the traditional ripe old age.

The simple senile psychosis, or senile deterioration, may be looked upon as an accentuation and exaggeration of these symptoms observed in pure Senility.

Among the first symptoms noted are gradual changes in character—ethical obtuseness; poverty of thought and

elaboration; marked and progressive memory impairment, even to the extent that only childhood memories are retained. In the beginning there may appear temporary sexual excitation with excessive indulgence and perversions. In some instances the patient may continue living a sort of vegetative life; and in others he may go into an active psychotic state, such as:

- a. Depression, anxiety with delusions of poverty, of being robbed, poisoned, and in imminent bodily danger, etc.
- b. Or excitement, overactivity, with childish euphoria and irritability, indulging in senseless extravagance, or assaults, especially along sexual line.
- c. Or in others, a paranoic trend may appear, with delusions of marital infidelity, which may lead to threats and violent assaults.
- d. Or delirious states, with confusion and restlessness, especially at night.

Permit me to repeat that all of these symptoms enumerated above, come under what is termed in Psychiatry, *Organic Reaction Type*, and are mainly observed in mental disorders with an organic basis.

OTHER PSYCHOSES

Because old age has its characteristic psychosis, namely, senile dementia, there is danger of regarding any psychotic disorder appearing in advanced years as senile dementia; inasmuch as the patient is old and exhibits symptoms of mental disorder, the temptation is that it must of necessity be a senile psychosis. This is far from being correct; obviously, mere age does not determine the character of the psychosis. Similar errors are made in diagnosing psychoses other than the Senile mental disorder; since schizophrenia or demential praecox appears more frequently in adolescence, every psychotic disorder at that period is not necessarily dementia praecox. Likewise, every psychotic disorder appearing at childbirth

is not necessarily a toxic puerperal insanity. The character of the psychosis is determined, as in physical disease, by its symptomatology, and not by mere age or physiological epochs, with which it might be associated.

In the same way, one may see various types of mental diseases during the senile period which are not organic and not due to regressive and destructive tissue changes that are characteristic of senile dementia. Thus, one not infrequently observes in the aged, benign depressions, excitement and depression of manic depressive type, Involutional depression, toxic psychoses, toxic delirium, etc., all of which are not characteristic of old age and are recoverable conditions. Errors in the diagnosis of such conditions would obviously lead to grievous and unfortunate results for the physician as well as the patient. Furthermore, it should be remembered that there is also such a condition as superimposed psychosis, which means that one type of psychosis is ingrafted upon another psychotic background. In a patient suffering from a Manic depressive psychosis it frequently happens that one observes the symptoms of a toxic or alcoholic psychosis. Similarly, persons who are suffering from senile dementia may at times show toxic delirium, manic depressive psychosis—depression as well as excitement—which are relatively curable mental disorders. Emphasizing again, all psychotic disorders occurring in aged persons are not necessarily senile dementia, which is an organic, degenerative and incurable malady.

MEDICO-LEGAL

Owing to the age of the patient and particularly the slowly developing character of the malady, some important medico-legal problems are apt to arise in the treatment of senile patient. An old man who may still be active in business may commit errors which involve large sums of money. It happens frequently that the party or parties who are on the losing side may question the contractual capacity of such a person. Again, a deteriorated old man who has been totally impotent sexually for many

years, may frequently experience sexual excitation as already referred to, and may become a ready victim of the seductive wiles of some designing young woman, provided, of course, that he is fortunate, or perhaps unfortunate in possessing a well lined purse, thus raising the question of his competency to contract a marriage.

There may also arise the question of criminal responsibility of a senile person who may have committed sexual assaults or perversions or is guilty of sexual crimes with children.

However, by far the most frequent medico-legal problem in which the mental competency of an old man comes into question is his testamentary capacity.

This situation almost always arises after his death and occasionally it may come up during his lifetime, when there is a feeling on the part of some members of his family that the will executed by the old man will be unfavorable to them.

The object of all these legal procedures obviously is to determine the mental competency of the individual at the time he performed these acts, whether they be business transactions, transfer of property, marriage contract, making a will disposing of his estate, etc. It naturally follows that as the medical evidence is the most important and decisive factor in determining the mental capacity of such an individual, the family physician must play an important role in the matter.

Inasmuch as simple senility in many instances merges insidiously and insensibly into Senile Dementia, and as some degree of mental deterioration may not be totally inconsistent with that mental capacity required by law, the question arises: *How may we determine when senility ends and senile dementia begins?*

Obviously, neither the time nor the purpose of this address permits a searching discussion of this problem. Suffice it to say, however, in a general way, that occasional lapses of memory, occasional exhibition of poor judgment,

carelessness in personal apparel and habits, occasional failure to recognize a friend, repetition of the same anecdote, unreasonable parsimony, occasional exhibition of irritability and suspicion without adequate cause, do not necessarily constitute senile dementia or legal incompetency.

But if such symptoms were continuous and persistent; if failure of memory were progressive and profound; if the mild suspiciousness developed into the dignity of delusions of persecution and marital infidelity; if the miserliness gives rise to delusions of being robbed; if the rambling talk of the old man become senseless chattering and incoherent; one would be justified in the conclusion that he was dealing with a case of senile dementia.

A striking illustration of this was shown in a recent will contest, when an aged man of great wealth of this city made one of the universities his residuary legatee. His competency was contested by certain of his relatives, and during the trial, as is usual, the contestants propounded a hypothetical question, in which were cited a number of isolated facts as a foundation for their claim as to the alleged incompetency of the testator at the time he executed the will. Some of the allegations were that the testator, a very wealthy man, would not purchase a motor car, that he would not employ stenographers, that he at times failed to recognize friends, that he repeated stories many times, that he would give orders to his servants and forget that he had done so, that he was very parsimonious, even to the extent of not purchasing table delicacies of which he was fond, that at times he went about improperly clad, that there was evidence of lack of sphincter control, that he would invite guests but would fail to treat them as hospitably as his station warranted, that he would tell vulgar stories in the presence of ladies, and other facts of similar character.

The contestants were almost successful in breaking the will, although the matter was eventually adjusted by settlement.

The most interesting and instructive feature of this will contest was, that this testator, in making the will in question had taken a more active and intelligent part than one would expect from a man of his years. There was documentary evidence in his own handwriting that he had repeatedly corrected and altered several drafts of the will, with instructions to his attorney, before he finally executed the will in question. These documents clearly and conclusively indicated that he was unquestionably competent and had full testamentary capacity, fulfilling the legal as well as the medical requirements. These documents could not be used at the trial, however, because of the strange technicality of the law, in that they were privileged communications between a client and his lawyer; otherwise there would have been no basis for a contest.

To put it another way, were we to select some isolated instances of peculiarities of conduct, defects of judgment, failure of memory and eccentricities and oddities of anyone in this room tonight, young or old, without a thorough personal examination, but depending only on these very few isolated facts and not on the persistence and continuity of them, we might readily excite suspicion as to his mental soundness and competency.

In determining the mental condition of a person, it is obvious then, that all the facts and circumstances must be taken into consideration, and therefore, the attending physician, because of his intimate contact, is naturally in a better position than even the psychiatrist, who might have had the opportunity of examining the patient only at a given time.

A physician, while administering to the physical ailments of his senile patient, should not neglect his mental condition, and should record his observations from time to time. Then, in case of a medico-legal contest, he will not only save himself from disagreeable embarrassments, but will also be in a position to protect and conserve the interests of his patient, which is clearly a moral as well as a professional duty incumbent upon him.

THERAPY

As to the therapy of senile dementia, obviously one cannot expect to accomplish much in a curative way, as the disorder is a progressive, degenerative and incurable one, only terminating with death.

We can only ameliorate the symptoms and endeavor to retard the progress of the disease. The treatment mainly consists in maintaining the physical condition at the highest possible level. It is important that the elimination processes should be kept at the highest efficiency, as auto-intoxication and endogenous poisons tend to intensify and aggravate the mental symptoms. The metabolism should receive the most careful attention. Over-eating and excesses of various kinds are, needless to say, most detrimental. The cardio-vascular system obviously requires the greatest care, as many of the major accidents, such as cerebral hemorrhage, thrombosis, embolism, etc., are due to the disorders of the circulatory system. One of the most troublesome and difficult symptoms to deal with is the insomnia and restlessness at night, for which a variety of sedatives and hypnotics have been used. Bromides and choral are still favorites, and the coal tar synthetics—allonal, medinal, luminal, etc.—are also of value.

It should be remembered that persons suffering from mental disorders show great tolerance to sedative and hypnotic drugs; it is a matter of clinical experience that psychotic patients who are restless, excited and anxious, may require twice the amount of sedative to induce calm and sleep. Therefore, whatever hypnotic or sedative is used, it should be given in one sufficiently large dose to bring about the desired effect.

The custom of giving smaller doses of hypnotics because the patient happens to be an old person, frequently ends disastrously, in that it has to be repeated often in order to be effective, and that the cumulative effect of such repeated small doses, through defect of elimination in old people, brings about toxic symptoms. I have seen many patients

with senile dementia suffering from bromide and choral poisoning as the result of the practice of giving small doses repeated at intervals over an extended period. It is scarcely necessary to add that drugs of all kinds, especially hypnotics and sedatives should not be given as a matter of routine, but only for specific purposes.

When there is depression with anxiety, opium and its derivatives act more efficaciously. Small amounts of alcohol, in the form of whisky or brandy, often act as a sedative for restlessness, especially at night.

A person suffering from simple senile deterioration should never be interned in an institution, but treated at home, provided the surroundings are comfortable, as such a sudden change from familiar environment frequently causes rapid disintegration. Hospital treatment should only be resorted to when he is a source of danger to himself or others, particularly when he is delusional, assaultive and cannot safely be taken care of at home. After a residence in a hospital, if the symptoms subside, it might be advisable to return the patient to his accustomed home surroundings, for the reason mentioned.

As to preventive measures, unfortunately very little can be accomplished, inasmuch as senile deterioration is, so to speak, the outgrowth of old age.

The measures which may retard senility, or the means which may check rapid regressive tissue changes incident to years, naturally would be the real prophylaxis for senile dementia.

In our present state of knowledge we can only point to some empirical facts as accentuating factors relative to the incidence of senile deterioration.

It is a matter of clinical observation that heredity plays an important part in senile dementia, or, stated more correctly, the tendency to rapid aging of the tissues.

Among acquired factors, infectious diseases, endogenous and exogenous poisons, syphilis, chronic alcohol-

ism, excesses of various sorts and mental and physical stress, may be mentioned as contributory causes.

As is well known, old persons have poor resistance to traumatism of various sorts, such as concussion, fracture of the skull, fractures of the long bones and even surgical traumatism. Surgical measures, therefore, which involve protracted and exhausting discomfort to the aged patient, should be avoided as far as possible. For example, surgical interference with a fracture of the neck of the femur, which renders the patient bed-ridden for many weeks, frequently may precipitate a Senile Psychosis.

An old man should never be advised to give up his business activities, unless his physical condition and business interests absolutely demand it. Even then, every effort should be made to induce him to occupy himself with some other activity or hobby requiring less energy and effort.

Retirement from business activity and lack of interest for old people in some instances is almost equivalent to physical and mental disintegration.

MENTAL HYGIENE

A word about the mental hygiene of old age. That the mental attitude of a patient towards his illness, whether it be one of pessimism or optimism, may have considerable influence on the outcome, is well known; in fact it is as old as medicine itself.

It is most gratifying that this principle, namely, the influence of psychic factors in the treatment of physical diseases, has gained great impetus in recent years, particularly following the experience in the World War. The curricula of many medical colleges at the present time include courses in Psychotherapy and Medical Psychology. I personally believe that if the mental attitude of a patient about to undergo a serious surgical operation or in a serious physical illness, received deliberate and systematic attention, it would surely yield tangible and astonishing results.

While making repeated routine examination of the pulse, temperature and various organs and functions of the body, why ignore the mind, surely not an inconsiderable function? Would it not be profitable to allay the fear, doubts and anxiety which dominate the mind of such a patient, by encouragement and the intelligent use of simple suggestive therapeutic measures?

Even a brief reference to the psychology of old age may be sufficient to demonstrate the enormous value of the application of the principles of mental hygiene in the treatment of a person in a state of senility.

The mind of an aged person is beset with fears, doubts and forebodings. His future as it were, is in the past. His social contacts become increasingly limited. He is constantly conscious of his loneliness and isolation. Friends and associates of his youth have already departed, or by reason of infirmity, are not within his reach. He sees neglect and inattention, unintentional though they may be, even on the part of his own children, for youth is not attracted by old age. His progressively increasing infirmities, both physical and mental, are constant reminders of the approaching and inevitable end.

In other words, he is in a state of anxious anticipation—an extremely unhealthy emotional state of mind—conducive to psychotic upsets.

As an illustration, old people who are about to undergo a cataract operation, frequently become delirious with extreme restlessness and anxiety. On investigation, the only apparent reason for such delirium could have been the atropine which was instilled into the eye in preparation for the operation, but obviously the amount of atropine thus given would not have been sufficient to cause a belladonna delirium.

Further inquiry would disclose that long before, such a patient had been fearful, apprehensive and anxious as to the outcome of the operation. In other words, he was in

a state of fear and anxious anticipation and a small amount of atropine merely incited the delirium.

Many other cases of similar character might be cited in old persons and at times even in the young, where such an abnormal mental attitude has been precipitated into a psychotic breakdown by a mere trifle.

The task of the physician is quite obvious in a situation of this kind. Here is a state of mind that needs constructive suggestion; reassurance; confidence; hopefulness; well directed advice and explanation, not in words only, but in deeds as well; not in a haphazard and aimless manner, but by following a deliberate and well laid plan with a definite goal.

Due regard to the principles of mental hygiene in old people, I am absolutely assured will be the greatest preventive in the incidence of senile psychoses.

I realize that the subject of mental hygiene might appear to most of you as being rather vague and intangible; but spiritual values—to inspire others with courage and optimism; to endeavor to lift people who are less fortunate by reason of physical or mental difficulties to higher psychological and spiritual levels by force of personality—obviously, work of this kind cannot be reduced to a formula.

As to the potency and practicability of suggestive therapeutics, one has but to point to various healing cults, even including fortune tellers. The most garbled, distorted, and, one might say, desultory use and misuse of these very principles have rendered them powerful and prosperous, not only in the number of their following, but economically as well.

The physician, by reason of the character of his profession and experience, even without special training, is abundantly possessed of this psycho-therapeutic power, if he only would permit himself to become conscious of it, in order to apply it in a systematic and well directed manner.

PRESENT STATUS OF THE PROBLEM OF THE SO-CALLED REJUVENATION ¹

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An appreciation of the present status of the problem of rejuvenation should in no way reflect on the subject as a problem but must indicate a feeling that almost all is yet to be done. One should not take the attitude sometimes expressed that it will always be impossible to prevent the changes of age in individuals. It seems unwise from a scientific standpoint to state that anything is impossible. To arrest the aging process in man or lower animals does not for any reason seem more impossible than to arrest development at different stages of incompleteness. The absence of a thyroid gland arrests the development of a child somewhere during the stage of its first few years following birth, and such an arrested child may remain a three or four year child, so far as development goes, for thirty years. Why might it not be possible to stabilize the chemical constitution of a human being at twenty-five years of age and maintain such a chemical balance for an indefinite period? This individual would stay a twenty-five year adult for the rest of life and would not undergo the constitutional changes or chemical modifications characteristic of regressive body history.

Surely it is a more likely task to keep a twenty-five year old man young than it would be to cause a senile individual to become young again. And probably until we have succeeded in arresting the changes in a young person of twenty-five so that he does not grow old, we shall hardly be able to undo the changes of age which are present in the senile individual of any age period.

It should be realized also that the very nature of this subject makes it one which first depends upon extensive animal experimentation before it reaches the point of

¹ Delivered October 9, 1928.

definite clinical application. In spite of this it has proceeded more or less in the reverse fashion. There is abundant clinical literature on the subject—often claiming definite and positive results—while the same effort with well-controlled animal experiments, has supplied a disappointingly small amount of convincing success. Aging is in no sense comparable to a species specific disease. Aging in man and in the other mammals is apparently a closely similar life process. Therefore, the investigation of the problem of old age definitely belongs to well-controlled experimental study on lower forms, with possible later clinical application to the human aged, or, better from the prevention standpoint, to the direction or treatment of the human young.

AGE AND GROWTH

In a broad sense, what is old age or what is aging? We may answer "growing old." Is it then a growth process, or how may it be related to growth? I am inclined to the view that aging can best be considered only from the standpoint of growth. An estimation of how much we know about age must depend upon how accurately we know or how well we understand growth. Unfortunately the entire problem of growth is still somewhat embarrassing. If we actually understood the phenomena of growth we might then be able to analyze or control the processes of aging.

Organic growth may be defined as the addition or formation of new living stuff. When this addition of living stuff is excessive an increase in size of the growing individual will take place. But it is evident that the same processes are involved in the formation of new living stuff whether it be merely to replace normal breakdown and waste or to increase the actual mass of living material. Thus in young individuals the increase in new stuff is usually excessive and a growth or increase in size occurs. Yet even in the oldest individuals an addition of new living stuff is constantly necessary in order to replace or repair the continual wearing down which is taking place. Therefore,

in a broad sense all living bodies must continue to grow or form new living material, so long as they live.

Growth in plants is often indefinite to a considerable degree but sooner or later something in their differentiation or in their environment such as, for example, the proportional amount of root surface or food getting area to leaf and stem area makes increase in size no longer possible and thus their growth becomes limited to merely maintaining the body in repair and function. These limits are frequently quite decided, so much so as to be a recognized character of the plant. Thus there are tall and short varieties of many plants. In the one variety excessive growth is simply continued further than in the other.

Within the different divisions of the animal kingdom we find many cases of more or less unlimited or indeterminate growth in size—and at the same time the most marked examples of rigidly limited or defined growth. What do the two conditions mean? Cases also arise among almost all animals in which the usual limit of growth is exceeded or on the other hand not nearly attained—so the giant and dwarf individuals occur. These anomalies on both sides of the usual definite body size indicate very clearly that the so-called normal or usual growth in size of the animal is the amount of simple growth permitted to take place against the inherited complex of conditions which tend to prevent growth from continuing at its early rate. When the balance is overweighed on the side of these growth inhibiting mechanisms, very little growth in size is possible.

The question also presents itself, why do certain kinds of mammalian tissues or cells continue to grow or reproduce throughout life while other kinds seem practically to stop growing in size and are only able to maintain repair after a very young or early stage. The skeleton of mammals and birds seems to be a very sensitive tissue to growth inhibiting substances, and since this is the framework of the body its importance is exaggerated in considering the question of growth limitation. To get real giant

and dwarf conditions the skeleton in particular must react, but the question of continuous growth involves all of the body cells and tissues. The epithelium of the skin and lining of the alimentary tract are constantly forming new tissue or new cells, so they are constantly reproducing themselves although they do not necessarily increase in size. The red blood cells and white cells of the body are being formed and the blood as a tissue is growing throughout the entire life of the higher animals. Thus these tissues are not completely inhibited by the presence of the conditions which limit increase in the entire body size. Nevertheless, the growth activities of even these tissues finally slow down to a balancing point so that the actual increase in amount or bulk of tissue which was taking place during the early total growing stages of life have ordinarily ceased. Yet these tissues are still perfectly capable of attaining their former growth capacities if the conditions permit, as is shown in the rapidly growing tumors and in a normal way in many periodic and temporary regenerations and wound-healing reactions.

Senile conditions are probably due to a derangement of the environment in which the body cells live, and it is not really growing old in time that affects the cells but a gradual change or modification in their surroundings which tends to lower their growth reactions. This may be due to changes in only a few organs or parts, and certain tissues show the effects earlier than others. All tissues do not age at equal rates, just as all are not equally inhibited in their growth reactions.

Some species of fishes, amphibians and reptiles show an indefinite growth in size, although this takes place slowly after a certain size is reached. Birds and most mammals on the other hand have a definite size limit even though it may be quickly attained, but in spite of the size limit they actually continue to grow though they do not increase in size. Minot thought senescence was the loss of power to grow and when growth stops decline begins. This is largely true, but, actually, when growth stops

death follows, since the inhibiting conditions of growth are also not favorable for life itself. Those animals that continue to grow in size even very slowly, so long as they live, really never become aged, although they may be very old in years, *e. g.*, the crocodile and the Galapagus turtles. The question of length of life is intimately connected with the problem of simple growth and the means of maintaining growth.

When increase in size stops growth has not actually ceased as considerable growth and regeneration are necessary for repair. But when all growth does actually cease then death must soon follow, *i. e.*, all living things must continue to grow in order to replace constant breaking down; in other words, growth is an essential life function.

Growth would be more extensive in the entire body if it were simply left to the tendencies of the tissues to grow, but growth is regulated and decreased on account of certain conditions which are established in the body. There may be an insufficient supply or flow of growth producing stuff (food) to the given tissues. When this supply is increased to a local area as after a wound new growth begins. When the excess stuff that is going to the terminal branches of a plant for some reason ceases to flow, then it may be accumulated along the stem and adventitious shoots appear. Or if such stuff accumulates in certain organs or parts of an animal on account of some disturbance in distribution, a tumor-like mass may grow from these parts.

Starving animals will regenerate or grow new parts rapidly at the expense of the starving body. Growth substances accumulate about the injured place but growth would also be caused if the substances accumulate there even without the injury. When an animal reaches its full size and apparently ceases to grow it might be thought that the cells have lost the power of further growth, but that this cessation is not due to such loss of power is shown by the ability to regenerate a lost part. The failure to

continue growth is due to something that inhibits the growth. This is illustrated by the effect of a piece of stem in preventing the bryophyllum leaf from forming shoots as Loeb so beautifully showed. Ordinarily the flow of material is only sufficient to maintain all the parts and no excess accumulates for growth.

In the case of a cretin (thyroidless individual), which lacks the power to grow and develop, the administration of thyroid would seem to stimulate growth and development of the tissues. However, there has probably been no actual stimulation, but simply the giving of thyroid in this case establishes a more or less normal balance of the growth regulating environment in the body and in such an environment growth is simply not prevented. Thyroid certainly will not make every dwarf grow, it matters not how long or fully it be administered. If it were a growth stimulant it might. In many cases thyroid seems actually to so disturb the situation as to stop growth. It is also probable that none of the so-called growth stimulating substances, such as some have thought the product of the hypophysis to be, do actually stimulate growth. Such substances at times may simply alter the existing conditions and thus liberate the growth tendency which is inherent in all tissues. Giants are incorrectly spoken of as overgrowths—simply the usual growth regulating and inhibiting stuffs have in this case failed to limit growth at the usual point. These are somewhat categorical statements which would require more space than is available for elaboration.

GONADS AND REJUVENATION

Rejuvenation is certainly biologically involved with growth, and growth is a general process depending upon the constitution of many things. Unfortunately, most of the work on rejuvenation has narrowed itself to the influence of the gonads or reproductive glands, as the controlling feature. It is difficult to see why this has been so largely the idea. Since castration of mammals and birds

has so little effect on the life span of the individual—the ox does not have a decidedly shorter life than the bull, nor certainly the castrated horse does not die earlier than the mare or the stallion. Neither do the castrated mammals show more marked senile changes than the normal male; in fact, they may fail to show so much. From the frantic cry for gland transplantation and reactivation one might almost suppose that castration or gonadal removal would be a fatal operation—yet the actual length of survival of the individual is not known to be affected by such removals. The mission of reproduction in life may be over exaggerated, and we should remember that the gonads have to do with reproducing the race and not with the preservation of the individual. In fact, in many forms of life the maturing of the gonads is fatal to the individual.

Steinach and others have claimed that the transplanted gonads lose the generative elements but increase the amount of interstitial tissue. This also is thought to take place after vasoligation, but careful histological studies on a large amount of experimental material does not confirm such a point of view as C. R. Moore, Nonidez and others have shown with several classes of animals.

Senility is not so decidedly locked up with the gonads but with general growth, since if growth continues as it does in certain animals, senility or old age does not occur, neither do the reproductive parts of the gonads degenerate. This is true in certain reptiles with indefinite growth in size, such as crocodiles and turtles that may probably live for hundreds of years and reproduce young as long as they live—and it may possibly be true of such long growing mammals as the whale.

Aging is actually a gradual inhibition of growth energy, possibly due to an accumulation of toxins but certainly accompanied by a changing chemical balance in the body. The correlation of the various organs and parts gradually weakens with the loss of functional harmony. The functions of the several organs seem to lose adjustment or co-ordination with the changing internal chemical environ-

ment. If the coordination in function such as is present in the normal human at twenty-five could be stabilized the individual might stay in the given condition of age.

Trees grow old and die. Elms live to about a few hundred years at most. Annual plants even in apparently favorable external environment die as soon as they have fruited but in many of these, if fruiting be prevented, the plant will live much longer, as if the formation of fruit in itself upset the chemical growth balance of the entire plant, and thus it dies; forming fruit took something out of the plant essential for continued growth and life. Old age, and finally normal death, is a gradual loss of the growth permitting adjustments, and these are likely dependent on a complex of things rather than on some particular organ or part. Surely any organ that may be dispensed with for a number of years, such as the gonad, must be emphatically questioned as the probable factor.

Body cells have capacity to continue young and to grow indefinitely, if removed from the inhibiting environment of the individual combination.

The symptoms of old age may some day be prevented by endocrine measures, but this will hardly be by the use of any one organ or substance but by a carefully regulated and gradual adjustment of many substances in the chemical constitution. The chemistry and chemical constitution must be maintained at the balance point of hardy maturity, which is a very short and critical period in the human life. In the human life span development or evolution seems to be very promptly followed by involution and degeneration after the highest point of functional efficiency, and certain organs involute earlier than others. In fact, all through life certain organs seem to play their role and then degenerate: the gill arches, the thymus, etc. So the individual is repeatedly a new combination of things, and the absence of one part affects all others.

Brown-Sequard almost fifty years ago attempted the use of testicular extracts on human beings, so the study is not

so novel as some would have us believe. However, this study is being most widely considered at the present time.

Steinach's statement—"reactivation of the endocrine function of the gonad by tying the vas deferens tends to mobilize the entire endocrine system and thus to produce reactivation throughout the whole organism"—seems almost unthinkable in connection with such a chemical complex as the human body. Yet some such manipulation of one part of a mechanical engine might in cases reactivate the entire engine; but even here it never removes the results of former wear and tear which the machine had undergone.

It is claimed that vasoligation lowers blood pressure, increases the circulation and produces hyperemia necessary for tissue regeneration. Such a statement demands consideration of those senile people who may have low blood pressure and still grow old.

DIFFERENTIATION

The nuclear cytoplasm relation changes with age—is this reversible? Does dedifferentiation and regeneration show that it may be? After all can total dedifferentiation and regeneration take place in the body or what are their limits?—this is the problem. It is difficult to correlate the work on low forms with no such endocrine balance as the human body possesses. A salamander may regenerate its entire extremity or its tail and although a man may regenerate the different tissues in his extremity, yet he cannot grow an entire new arm. There is some growth inhibiting process which prevents this—the co-ordination of regenerating parts is lost. Dedifferentiation and regeneration in lower forms are an entirely simpler and possibly almost different problem from rejuvenation in man.

The problem of rejuvenation is open for solution. One should not think it impossible to solve—but at present we have scarcely made a beginning.

APOPLEXY¹

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Before this audience an attempt at an exhaustive discussion of apoplexy would be entirely out of place. It is my purpose to avoid encyclopedic treatment of this subject; and to present to you a few points only which have given rise to special discussion, and to give you some personal impressions. Let me assume that all the ordinary facts regarding apoplexy are known to the majority of physicians. It is common knowledge that the term apoplexy is used to describe a condition which may or may not come on with the loss of consciousness in which there is more or less sudden development of paralysis, either of one-half of the body or of limited areas of the body. It is equally well known that this paralysis is generally associated with an increase in the deep reflexes and a corresponding diminution of the superficial flexes. That while many of the cases are rapidly fatal a very marked amount of recovery occurs in many instances.

The apoplectic seizure is so often due to hemorrhage into the brain that the mistake is frequently made to identify the two terms. As a matter of fact the apoplexy of the senile or pre-senile period (and it is that part of the subject which especially interests us) is associated with degeneration of the arteries, above all with the arteriosclerotic process and this degeneration of the arteries may lead either to hemorrhage or to the clotting of the blood *in situ*. Allowing for the possibility of an embolus being hurled into some artery of the brain we may claim that apoplexy is due either to hemorrhage, or to the occlusion of a blood vessel. Whether the apoplexy be due to hemorrhage, to thrombosis or to embolism is not merely a matter of academic interest, but it has most important relations to the diagnosis and the treatment of the individual case.

¹ Delivered October 9, 1928.

Hemorrhage is the proof of aging arteries, thrombosis also occurs at this period but it may also occur with any changes in arterial structure, above all with the endarteritis of syphilis. Embolism may of course occur at any time of life whenever there is vascular or valvular disease. It is important therefore to know whether or not these different morbid states can be recognized by different sets of symptoms and for this purpose the mode of onset of the apoplectic attack must be considered. It is difficult to draw hard and fast rules, yet it is safe to say that hemorrhage, especially if followed by paralysis, is accompanied by loss of consciousness in the vast majority of cases. That paralysis resulting from thrombosis is often developed without any loss of consciousness and in embolism the development of all the symptoms may be quite as sudden as in hemorrhage. During many years, personal experience has warranted these conclusions. All sorts of statistics have been compiled on this subject. The most reliable claim that consciousness is lost in 75 per cent. of cerebral hemorrhage; and in 47.7 per cent. of cases of embolism; and some have claimed that 45 per cent. of cases of thrombosis are associated with coma. To the last I cannot subscribe yet these figures would seem to show that it is well not to be too dogmatic in ascribing the apoplectic insult to one or the other of these three processes. From a practical point of view it is well to remember that the apoplectic attack which is introduced by very deep coma may clear up and give a more favorable prognosis in the end than the apoplectic attack which begins without coma but with a gradually deepening stupor. Gradually increasing drowsiness is ominous. At all events no prediction as to the ultimate outcome can be made safely in any case until after the lapse of 24 or 48 hours. Any signs of returning consciousness within the first few days are favorable as to the ultimate result. The secondary edema which is developed both in connection with hemorrhage and also with thrombosis is a very important and uncertain factor. Many of the symptoms which develop after the onset are due to this secondary edema and the

further progress or the recession of this is a matter depending upon so many varying factors that it would be difficult for any one to foretell the further progress of the case. It is fair to ask why this disposition to cerebral hemorrhage at the senile or pre-senile period?

Years ago while I was lecturing on diseases of the nervous system, I was in the habit of saying that cerebral hemorrhage occurred after the age of 45 and between that age and 65. As I was approaching that age myself I found myself more or less unconsciously pushing the lower limit forward, and I was claiming the period from 50 to 70 as the time of life during which apoplexy occurred most frequently. At the present time I have no hesitation in stating that the 6th, 7th and 8th decades of life are the age in which cerebral hemorrhage is most frequent. It is over 60 years ago that Charcot and Bouchard² published their famous article in which they insisted that the degenerative changes of the blood vessels were frequently associated with the formation of miliary aneurisms, and that it was the bursting of these aneurisms that resulted in the effusion of blood into the substance of the brain causing the paralysis; and inasmuch as one of the branches of the middle cerebral artery is the blood vessel most frequently involved, it was easy to explain as the result of this the more or less complete hemiplegia of the opposite side of the body. All this was accepted for many, many years as the purest neurological dogma. It was almost an article of faith with the writers of neurological text books and with those whose duty it was to lecture on the subject. As late as 1905 Monakow,³ who reviewed the entire subject, still believed that the bursting of miliary aneurisms, according to Charcot and Bouchard, was the main cause of cerebral hemorrhage, and he was also of the opinion that these aneurisms began with the degeneration of the muscular coat, and not necessarily with changes in the intima. Occasionally some doubt arose in the minds of neurologists

² Charcot et Bouchard—Nouvelles recherches sur la pathologie de l'hémorrhage cérébrale. *Arch. de Physiol. normal et pathology.* 1868.

³ Monakow, C. von.—*Gehirnpathologie.* 2nd ed. Vienna, 1905. p. 1105.

as to the actual importance of these military aneurisms. The matter was most ably discussed by L. Pick⁴ in 1910, who took the trouble to search for these military aneurisms by special methods and found that "the importance of military aneurisms in the causation of hemorrhage has been exaggerated." As pathologist he seemed to be interested more in the *military* character of the aneurisms; while he believed that these were not so common he found that there were hyper-military aneurisms, coarser aneurisms and also spurious aneurisms; so that the ultimate result of his research as it seems to me, was that Charcot and Bouchard may have erred as regards the military character of the aneurisms, but after all some form of vascular dilation or aneurismal dilatation was the common cause of these intra-cerebral hemorrhages. Osler in his several writings on the subject and Thomas⁵ accepted the doctrine of aneurismal dilatation; and so in spite of the skepticism of some, the doctrines of Charcot and Bouchard have held sway up to very recent years. The arterio-sclerotic changes that every one agrees occur with advancing years, the high blood pressure, the renal disease, would naturally have to be considered as the main predisposing causes of these hemorrhages.

Some studies of later years have however called attention to other conditions that may predispose to hemorrhage—thus Globus and Strauss⁶ in a recent paper on massive hemorrhage, believe there are pre-existing necrotic areas or areas of softening which make hemorrhage into the brain substance so much the easier. Whether aneurismal or not the walls of blood vessels give way and hemorrhage ensues. But the last few years have disturbed the general calm that had spread over this subject. Apoplectic seizures have been observed with increasing frequency in persons of middle age and without any definite

⁴ L. Pick—*Berl. Wochenschr.* 1910 Feb. 21 & Feb. 28.

⁵ Thomas—*Osler's System of Medicine*—Vol. 6, p. 321. 1928.

⁶ Globus & Strauss—*Massive Cerebral Hemorrhage in its relation to pre-existing cerebral softening. Arch. Neurol & Psych.* August 1927. Vol. 18, p. 215.

assignable cause. In former days I was in the habit of saying that a person in middle age who has no cardiac or renal disease and has not had syphilis has no right to develop an attack of apoplexy. Marburg⁷ only very recently has taken up the subject of the occurrence of cerebral hemorrhage in younger individuals and finds in his very careful histological studies that these cases of cerebral hemorrhages in youthful individuals are due to toxic or toxic infectious changes in the walls of the blood vessels. That these remained latent for a considerable period of time, but may lead to sudden increase of blood pressure and consequently hemorrhage, through over-excitement or over-work or some other marked emotional factor.

This leads almost directly to the considerations of a diagnostic factor of the greatest importance. It has been my own experience as no doubt that of many other neurologists, that the occurrence of epidemic encephalitis has upset previous diagnostic statutes. We have all seen apoplectic seizures in younger individuals but also in men and women of the senile and pre-senile period who showed no evidences of arterio-sclerosis, whose kidneys were normal and whose heart was sound. A very prominent instance of this sort concerned one of our well known legal dignitaries, at the age of fifty, who developed what appeared to be an ordinary apoplectic attack, coming on after the fashion of a thrombosis, of a slowly developing paralysis of the left side of the body, without loss of consciousness with some dysarthria but no true emiphasia. There was no warrant for the suspicion of lues—there was surely no cardiac disturbance; and the man who had just returned from an important mission abroad. The cause of the Apoplexy was in doubt; after the lapse of five or six days some symptoms appeared involving the arm of the opposite side of the body and also some of the ocular muscles. It is interesting to note that in Marburg's cases there were some bilateral symptoms, and he speaks of a toxic or toxic infectious disorder. This bilateral development of symp-

⁷ O. Marburg—*Deutsche Zeitschr. f. nervenheilk.* Vol. 105, p. 22. 1928.

toms in my own patient took the case out of the ordinary category of apoplectic hemiplegia and suggested the probability of an encephalitic disorder. The entire course of the disease proved this supposition to be correct. Bilaterality of symptoms and association with ocular palsies have been most helpful in the diagnosis of other cases. The possibility of encephalitis must be considered in all cases of apoplectic seizures and especially if such occur either in youthful individuals or in elderly persons whose general condition was or is remarkably good. The dogmatic interpretation of an apoplectic seizure may lead to serious errors in diagnosis. It is well to remember that an apoplectic seizure may occur in uremia, in the earlier stages of general paresis or that it may be an early symptom of intra-cranial neoplasm. I need not dilate upon the necessary methods of examination that should be taken in every case, but examination of the fundi and of the spinal fluid should be made to prove or disprove the probability of any such relation.

Aside from the question of diagnosis the prognosis is a matter of great importance. Few conditions are more alarming than an attack of apoplexy, and yet there are few serious afflictions in which so great a degree of recovery is possible. It is particularly in this group of cases that I would plead for the expression of that special optimism with which I have been frequently charged. However severe conditions may appear to be at the *outset*, there is no harm in expecting a very considerable amount of recovery. As soon as the patient shows signs of returning consciousness, or his stupor does not deepen one is warranted in predicting some recovery, that the leg will soon show returning vigor; that the patient will be able to get about; while it is of course well known that the progress of the arm toward recovery will be somewhat slower. It is fortunate for the leg that it has representation in both hemispheres and that therefore the elimination of the function of one hemisphere does not preclude a certain amount of recovery. The upper extremities have become specialized and the functions of each are under

the control of the opposite hemisphere. For this reason, if for no other, try to make children ambidextrous and give up the rather foolish insistence that the right hand should be used in preference to the left.

More important than mere prognosis is the question whether anything can be done to *prevent* apoplectic seizures. The premonitory symptoms, above all slight renal changes and a continuous high blood pressure, are so significant that every effort should be made to improve or counteract the underlying conditions. While we have all seen patients with blood pressure of 200 or more going along well for years, many of them are surely candidates for subsequent apoplexy. I need not go into the details as to what should or should not be done under such conditions but the most important thing no doubt is the establishment of a careful dietary routine, the absolute moderation with regard to work, the insistence of sufficient exercise, the limiting of the protein diet, great moderation in the use of alcohol, and much against my own inclination, I believe that it is also important as the years go on to avoid the excessive use of tobacco. Surely, excessive use of tobacco is more detrimental to the vascular and sympathetic nervous systems, than is the moderate use of alcohol. Our Vienna colleagues believe that we under-estimate the cumulative effect of nicotine. Men have been subject to vascular disorders which have been attributed to nicotine poisoning. Women have hitherto enjoyed a certain immunity because of better habits; but from the way in which the gentler sex has taken to cigarette smoking, I have no doubt that in another decade statistics will have to be revised as to the relative immunity of women from various vascular disorders. We must soft-pedal this argument against tobacco, lest some zealots organize an anti-tobacco league. In this league there will be no powerful female vote. So many prefer the "short and merry life" that there is no telling whether either men or women will in the early years of life regulate their social habits in

such a way that they will not become candidates for apoplectic seizures during the later decades.

And what are the therapeutic measures, once the attack has set in? On many occasions I have said to the physician, do as little as possible. Especially in conditions of apoplexy, you cannot improve upon the *vis medicatrix naturae*. Of course a patient with a bounding pulse, high blood pressure and a cyanotic look, with stenosus breathing and deep coma should be bled after the fashion of our forefathers improved by modern methods. You may also give some nitroglycerin, and you may apply the icebag to the head. If only one were absolutely certain of hemorrhage or embolism rather than thrombosis. If there is a probability of thrombosis do very little at the start, secure absolute rest for the patient, disturb him as little as possible for the first four or five days, and then give him the full benefit of iodides, and such other specific up-to-date measures as your vast anti-luetic experience may suggest. If there is reason to fear increasing edema, after hemorrhage and especially after occlusion of a cerebral blood vessel, careful spinal tapping may be considered and also the use of hypertonic salt solution.

I have been much impressed with the fact that cerebral hemorrhages occur in children, and the effusion is often larger than in adults; the children commonly survive, many of them more or less crippled. It is not fair to assume that the child's brain is more tolerant than the brain of the adult, except that it participates in the greater vigor of early years. Is it not more natural to suppose that if the apoplectic attack of later years prove fatal, accompanying conditions and associated disease are to a great degree responsible for the unfavorable outcome. Age may boast of honor, wisdom and experience; Youth outweighs them all.

POSTPONEMENT OF THE INDIVIDUAL PROCESS OF AGING ¹

(Abstract)

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CELLULAR IMMORTALITY

Living tissues have been kept alive by various experiments and in some instances longer than the average duration of life of animals from which the tissue was taken. It would seem that all the essential tissues of the metazoan body are potentially immortal. Pearl, quoting from the work of Carrel, Harrison, Wilson, Leo Loeb and others, comes to the conclusion that "It is the differentiation and specialization of function of the mutually dependent aggregate of cells and tissues which constitute the metazoan body which brings about death, and not any inherent or inevitable mortal process in the individual cells themselves."

In the study of medicine one finds that diseases are caused by the introduction of poisons from without or are a result of poisons produced by one cell group whose disordered function produces materials which may injure other cell groups of the metazoan body.

It has been shown that a large amount of danger to the human organism which comes from without may be prevented.

An endeavor has also been made to explain the fact that a proper regimen of life diminishes to a very large extent the possibility of injury to each of the cell groups.

As the individual grows older, evidence is almost always found of injury to a particular tissue composed of specialized cells and the causes of this injury are extremely difficult to ascertain.

¹ Delivered October 2, 1928.

HOW LONG DO WE LIVE?

Given a number of individuals at various ages, at each year of life a certain number die and a life table may be constructed by beginning with 100,000 children born, and deducting the number who will die in each succeeding year according to the existing death rates at each age group. Each year we find the number still alive diminishing but with our present expectation of life, these 100,000 individuals will live 51,577,502 years or the average of 57.7 years. From this life table we know that the average age at death is 57.7 and that out of 100,000 individuals, 72,074 will live to be fifty, 59,639 will live to be sixty, 41,705 will live to be seventy, 15,331 will live to be eighty, 1,780 will live to be ninety, 33 will live to be one hundred, and these last will all have died before the 107th year has ended.

Do human beings live longer than 100—110 years? We hear that John Parr lived to be 152, was autopsied by William Harvey and his remains buried in the Abbey, that Henry Jenkins lived to be 157 and Margaret Desmond lived longer. There have been no similar cases reported in the last hundred years even though the period of expectation of life has steadily lengthened. Is this not because we have more accurate knowledge of individuals by birth registration, identification and so on? Young gives clearly the various reasons for disbelieving these cases of alleged longevity.

It is reported that in Bulgaria and Rumania there are more centenarians in proportion to the total population than there are in this country. This is ascribed to the greater use of milk, especially that type known as yahauth, or as we know it, milk with the Bulgarian bacillus added to it. There may be more centenarians in these countries but the statements should not be accepted until more definite and careful analysis has been made of the records. In 1920 the United States census reported 4,267 centenarians, 69 per cent. of whom were negroes, and Dublin notes that as our census machinery improves, the proportion of reported centenarians becomes smaller.

AVERAGE AGE AT DEATH

In 1901 the average expectation of life in the United States (registration area) was 40.24 years, and in 1926, 57.74 years. This marked change does not mean, necessarily, increasing longevity but a great saving of life in the lower age groups and a great increase in the number who reach maturity and 65 years, the threshold of old age. Under the conditions existing in 1901, out of every 100,000 individuals born 40,911 will reach the age of 65, but under present conditions there will be nearly 52,000 reaching the age of 65. The life tables show, however, practically no gain after the age of 65. At that age in 1901, the expectation of life was 11.86 years and in 1920, 11.97 years. Now it is probably a little over 12 years. That is to say, that notwithstanding the great increase in the average age at death, the far larger number of persons who reach the age of 65 have little chance of living to a ripe old age.

CAUSES FOR THESE INCREASES

Infants have a far greater chance of growing up and reaching maturity in this country than they had 25 years ago. This is due to the intelligence and financial ability of the masses of the people to apply hygienic measures, to secure sufficient and proper food, clothing and shelter. It is also due to the application of well-known public health measures for the control and prevention of disease, and to the protection of the public by the maintenance of safe water, milk and food supplies by the public health authorities.

CAN DISEASE BE FURTHER PREVENTED?

Irving Fisher sent a list of some 90 diseases to a number of prominent physicians asking them to indicate the percentage of deaths from these diseases which could be prevented. Forsyth analyzed the replies and prepared a life table showing the expectation of life if the diseases were prevented in accordance with the ratio indicated, and found that on an average, 12 years and 245 days could

be added to the span of life. (Pearl's *Biology of death*, chart 165, pp. 164-165.) These tables were based on the mortality rates of 1900-1910, but if applied now, would undoubtedly show a greater expectation of life. The expectation of life in 1900 was 49.4 years and if the various possible savings of life suggested by the physicians were obtained, the expectation would be 62.11.

The forces that have been at work in adding to the average length of life are various and cannot be ascribed to any one factor.

Biologists, biometricians and statisticians have proved to their own satisfaction that public health measures have played but a small part in reducing mortality.

Drolet has shown that there is a marked difference in the death rates from tuberculosis in different sections of New York City, Manhattan especially showing marked contrasts, the wealthier sections having the lowest mortality rates, and the poorer sections, the highest.

Guilfoy has prepared a series of maps of Manhattan giving the mortality rate, all causes, and for various diseases. These maps are not correlated in any way, but they show that in general, death rates are higher among the poorer sections of Manhattan and lower among the wealthier sections.

When studies are made of mortality from specific causes correlated with family income, there is found almost always a definite relationship—the poorer the family, the higher the specific death rate.

This is not true, however, of diseases which occur in the later periods of life. Hence, one is led to assume that there is a larger proportion of older persons among the well to do than among the poor. So, notwithstanding the arguments to the contrary, there is a definite relationship between poverty and mortality.

HOUSING

There are a number of individuals who have shown that there is a definite relationship between the number of persons living in one room and the death rate. It has been proven for tuberculosis that the larger the number of persons living in one room, in a family where there is a case of tuberculosis, the higher the death rate.

Poor housing, filthy tenements and slum areas are therefore held responsible for a high death rate.

PUBLIC HEALTH MEASURES

Robinson Crusoe had no need of a health department, for the original idea of public health activity was to suppress epidemics. As scientific knowledge of disease was acquired, the idea of suppression gave way to that of prevention.

It will not be possible to do more than point out the fact that some diseases can readily be prevented by measures readily applied, as for example, vaccination against small-pox, if fairly universal, prevents the disease.

Proper filtration or purification of water supplies almost wholly prevents typhoid fever and also cholera to a great extent. Draining marshes, oiling stagnant water and screening houses diminish the incidence of malaria to a minimum and in some localities, to almost complete disappearance. The same is true of yellow fever.

Other communicable diseases as scarlet fever, measles, diphtheria and tuberculosis are not so readily controlled or prevented. It is the individual who must be reached first by physician and then by health authority, but the physician does not come until sent for and often arrives too late.

The reduction of incidence and mortality from these diseases has been constant in this country during the past quarter of a century. It is believed that no one cause has operated in the reduction but public health measures, and

in particular, early isolation or quarantine has been perhaps the most important measure.

Better housing, permitting often a single room to an individual, more cleanliness, improved methods of the disposal of human and other wastes, and the more effective control of the milk supplies of our cities, especially by effective pasteurization, have all acted favorably.

A factor often overlooked by public and voluntary staffs is the marked improvement in the practice of medicine. Earlier diagnosis, better treatment and competent nursing have saved the lives of thousands, or in tuberculosis, postponed death for almost an indefinite period, but more than that have prevented the infection from attacking other members of the family in countless instances.

In more recent years many health departments have undertaken activities which relate to individual health, and endeavor by physical examination and advice, to aid the individual in preventing the onset of diseases which are not a menace to other persons in the community. This field is largely educational and had its inception in the infant welfare clinic and the results are more difficult to measure.

Meyer has shown that the baby clinic alone cares for such a small proportion of the total number of infants that its influence is not very large. Physicians have scoffed at the baby clinic, one medical society going so far as to vote the infant welfare clinic a menace to public health.

It has been proved over and over again that a very large proportion of mothers who take their infants to such a clinic will not seek medical advice, and that the results obtained in the clinic are far better than among infants of the same walk of life whose mothers are not advised at all.

OCCUPATIONS

There are rarely any definitely determined factors in the selection of an occupation. Youth appreciates or is

forced to accept the fact that one must work for a living and a livelihood is sought usually in the occupation which is nearest at hand, opportune, or available. Parents and the youth about to engage in an occupation do not know that the choice of an occupation is determined unconsciously by the intelligence and physique of the individual and by his mental outlook on life and that of his parents.

One does not hear often of an occupation being undertaken or shunned because it is dangerous, for youth is rather more apt to court danger and is usually self-confident even though aware of possible risks and fully expects to live longer than anyone else no matter what the hazards of his occupation may be. The general public does not usually know that one occupation is more hazardous than another for there are many individuals in almost every occupation of mature age, many of whom may be classified as old.

When statistics are compiled which include thousands of individuals, it soon becomes obvious that industry requiring either physical labor or the operation of machinery entails more risks, a greater number of accidents and a higher death rate and shorter duration of life than is found in the clerical and professional classes.

In industry, the risks are primarily from dust, gasses and accidents and the various factors which are found in factory work such as poor ventilation, insanitary conditions, long distances from home to factory, posture and hours of work.

On the other hand, the professional and clerical class are frequently confined in places just as insanitary as many factories, often subject to press of work with overtime and all the stress which goes with our modern life including the risks of traveling and climate. The risks of traveling and climate are sometimes great in the professional and business field for many individuals are situated for long periods of time in climates where they are susceptible to the risk of infection from malaria, typhoid

or tropical diseases and frequently subject to unusual temptations exaggerated as a result of the climate or lack of comradeship.

The risks and dangers of industry have been well recognized in this country and it is unusual to find at the present time a large industry which has not established some type of health service for its employees. This health or medical service has reduced the labor turnover, the cost of medical care, the number of days lost in the industry and the cost of it has been placed upon the ultimate consumer of the product of that industry where it probably belongs. Industries employing a small number of individuals find it well nigh impossible to carry the overhead cost of a medical service and need guidance and assistance from voluntary agencies or government to safeguard the health of their employees.

HEALTH EDUCATION

How much influence does the continued health propaganda have on the lives of our people? Impossible to estimate but undoubtedly it makes a definite impression, particularly when made available to school children and the young adult.

In a nation of advertisers we accept statements that are widely heralded as true, and the health literature which is distributed is far more accurate and free from exaggeration than that found in the commercial field.

WHY DO WE GROW OLDER?

It is because our people have acquired a better knowledge of child care, an intelligence which enables us to care for our own bodies and our children's in a hygienic way, and because of the improvement in our economic situation, the vast majority of people have the means to provide themselves with food, shelter and clothing. This adequate standard of living, although not yet universal in this country, is still far more general than exists in other countries

today, and probably a better condition exists here than ever existed in this or any other country at any time.

This intelligence and standard of living alone would not suffice were it not for the improvement in our health departments and the widespread protection of our water, milk and food supplies pretty generally guaranteeing their safety and freedom from material carrying disease. Nor would the health department alone suffice were it not for the more and more efficient effort of the health field worker, the practicing physician and his aid and ally, the nurse.

PERSONAL HYGIENE

Most babies are born well and if properly cared for may be kept well. The modern pediatricist has produced wonderful results in this direction and a great deal of our reduction in infant and child mortality has been due to the improved practice of medicine in childhood.

As soon as the child is old enough he should have some instruction on how to keep well. This should not be formal in character but with simple rules of health both at home and at school the young child soon learns to wash his hands before meals and after visiting the toilet, to use a handkerchief, to eat slowly and moderately, to sleep with windows open, to wear overshoes on wet days and so on. A great deal can be done also in training the child to acquire proper mental habits which is a matter of great importance to physical health. Physical exercise does not often have to be urged upon a child but more often he should be guarded against overdoing it.

All the proper rules of health, every precaution to keep a well child well, will be of no avail if the public water supply is polluted, milk supplies impure, health department precautions against communicable diseases ineffective, poverty restricting food and clothing and size of living quarters and medical practice of low standard.

In certain families an annual physical examination is hardly necessary for very often the parents notice

promptly the slight squint, a drop of the shoulder, a change in gait, the open mouth while breathing, shortness of breath, trifling skin disorders and muscular twitchings. In fact, almost any departure from the normal is noted and medical or dental advice is sought for.

In other families, unfortunately a large number, a regular physical examination will reveal physical defects or abnormal conditions needing treatment but no amount of argument convinces the parents of the desirability of treatment, even in serious conditions.

ADULT LIFE

The individual arrived at his majority and independent is very prone to do very much what he likes in regard to his personal habits, is apt to over-indulge in eating, drinking and in exercise, frequently taking too much exercise and too little sleep, overworking or under-resting and burning the candle at both ends. As middle age approaches one's taste moderates, experience teaches him to alter his habits, marriage sobers him, responsibilities compel him to lead a more regular life and he learns the importance of keeping fit.

CONDITIONS AFFECTING HEALTH AND LONGEVITY

The human body consists of many systems and organs and tissues of different kinds, each of which react on the other. Many of these tissues and organs are susceptible to a particular injury if poisons are introduced from without.

We know the effect of certain bacteria on the heart valves, the lung tissues, nervous tissue and so on. We also know the effect of metallic poisons on many of the organs, particularly the liver and kidney and nervous system. We have learned that by the observation of many health measures and the application of intelligence, many diseases and conditions will be prevented. We need food and drink, rest, sleep, air and shelter to maintain life. Although many theories and opinions have been given and

volumes written on the subject, there is no definite specific regimen that one can lay down for every adult.

We do know that underfeeding results in malnutrition and a train of disorders may ensue if certain dietary factors are lacking. Scurvy, rickets and beri beri are dietetic deficiency diseases and death may ensue from these conditions. It is probably true that more people suffer or die from underfeeding than from overeating if one considers the entire population of the world. There are some who believe that 20 or even 30 per cent. of school children are undernourished (W. R. P. Emerson and Wood) but in the far larger proportion of these children, undernourishment is often synonymous with underweight and the cause is frequently a physical one and not due to the lack of sufficient food supply, though often due to an improper diet. The bountiful food in this country and the relatively high wages obtained by nearly all classes of society make overfeeding a far too frequent habit. This frequently results in obesity though occasionally one may steadily gain weight on a very limited diet from faulty metabolism. It may be stated very definitely that persons who are overweight—those who weigh 10 per cent. or more than the average for their years and height, do not live as long as the average. These individuals do not die of digestive disturbances as a rule but of cardiac, renal and arterial disease, or acute respiratory conditions. There are many persons who are faddists in regard to diet, some are vegetarians, some won't eat this or that on account of some whim or fantasy. A great many persons are asked on their ninetieth or one-hundredth birthday, to give the reasons why, in their judgment, they have been able to live so long. In practically every instance, a limited and carefully selected diet is given as the cause. Some ascribe the restricted diet alone as the cause of longevity. Cornaro, the Venetian, who lived to be 102 limited his food to twelve ounces daily, consisting of bread, soup or light broth with egg, or other similar dish, veal, kidney and mutton, fowls and birds and salt and fresh water fish. Wine also was limited to fourteen ounces daily. His friends and family.

noticing his leanness when he was 78, urged him to eat more and he increased his daily allowance to fourteen ounces of food and sixteen ounces of wine. He soon became melancholic, suffered from pains in his side and fevers and then reduced his dietary to his former allowance. Several of his maxims are worth remembering: "Not to satiate one's self with food is the science of health"—"Whoever wishes to eat much must eat little"—"The food from which a man abstains, after he has eaten heartily, is of more benefit to him than that which he has eaten."

We know that the amount of food consumed should vary with the amount of muscular work performed and the size and weight of the individual.

Is it not clear that as old age approaches, less and less muscular work is done, and therefore much less food is needed?

Further, there is ample evidence to show that older people cannot stand the gastronomic feats of youth or middle life. How can one tell whether he eats too much? First, adults who are gaining weight are obviously eating too much. Then it is true that many persons who keep an even weight often eat more than they need and if they reduced their diet they would still maintain their weight. The only sure way is to eat as little as one can and maintain his weight, which should be the average for height and age. If one eats three meals a day it is a safe rule to leave the table having still a desire to eat more. One can do more and weigh and measure all his food and estimate the number of calories needed for him and also the relative amounts of protein, carbohydrates and fat that he should consume, determining the necessary vitamins to take. If this is done without medical advice and supervision there is a good chance of the individual's becoming "hipped" on himself and a nuisance and a bore to himself, his family and friends.

Water or foods in liquid form which contain a large amount of water are essential for body health. The

amount of water required varies with the size of the individual and the amount of perspiration which takes place and also with the amount of liquid foods taken which are mainly composed of water.

In many countries it has been the custom from time immemorial for the majority of the adult population to take as part of their liquid a certain amount of wine or beer or diluted spirits daily. There have been many arguments for and against the use of alcoholic beverages and there are those who believe that alcohol in any amount is a poison and consequently should not be consumed at all. There are others who believe that alcohol replaces the need of a certain amount of food and that a small amount of it, less than an ounce a day, in diluted form, is useful especially for older people. There is no question but that many persons live to a ripe old age even after they have consumed regularly a half ounce to an ounce and a half of alcohol daily.

On the other hand there are many persons who believe implicitly that those who take one glass of beer or wine or spirits, will steadily increase their dose and become "chronic alcoholics" to the destruction of themselves and their families, and unfortunately this is true in a small number of cases, and so true in this country that it has resulted in very drastic laws which aim to prevent the consumption of alcohol in any form except for medicinal or sacramental purposes.

SLEEP AND REST

There is an old adage that a man should sleep eight hours, a child nine and a fool ten. To determine the actual amount needed is a task which science can hardly determine, and we fall back upon human experience and human desire.

If an adult slept only four hours of the twenty-four, we should feel that there was something wrong with him. We know that the child needs more and the adult less, that many adults are not fit without eight or nine hours, and

that many keep in good condition indefinitely with five or six. Sleep implies rest and we have come to a situation of accepting eight hours as a sufficient time daily for work. This has resulted as a concomitant of an economic development and does not mean we need eight hours for washing, dressing, eating and for leisure.

Continued overwork and lack of rest and sleep will injure the human economy and occupations which require long hours of labor—physical or mental or both—will show higher death rates than those which have shorter and less laborious hours.

EXERCISE

The economic development of this country has also produced a very large professional and clerical class who are needed primarily in desk work and who have relatively little opportunity for exercise. Many physicians recommend to this class of individual that a walk of at least three miles should be taken daily or its equivalent, and recommend to others various types of physical exercises which may be taken in one's room. Many of these physicians who give these prescriptions as to exercise so glibly, do not apply it to themselves, walking only about as far as is necessary to enter their cars and to get out again to enter a patient's house. If many doctors do not take regular exercise themselves we must know from this that it is a prescription onerous and difficult to carry out.

There are many individuals who feel that this lack of exercise might be counteracted by a vigorous amount of exercise on Saturdays, Sundays and holidays, but it is quite likely that regular daily exercise in limited amounts is better for the general muscular tone of the body than lethargy during the week and over exertion at the end of the week.

PRACTICAL PREVENTIVE MEDICINE¹

(Abstract)

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Checking the "Plague of pseudo-medical cultists" is an important phase of the promotion of practical preventive medicine.

Osteopaths, chiropractors, neuropaths, naturopaths, mechanoneuropaths, and other individuals designating themselves with various pseudo-scientific designations have appeared, thrived and multiplied. At first the menace to the public health by the administrations of the agents of the cultists was ignored by the medical profession.

But physicians are now studying the reasons why so many patients are intrusting their lives and health, and the lives and health of their families to the ministrations of a group of, as a rule, ignorant cultists.

A greater effort on the part of physicians to understand all the factors entering into the patient's condition and life, whether he is seriously ill, slightly ill, or apparently not ill at all, would help greatly to prevent people from going to quacks.

Even when physicians sometimes find no symptoms of organic disease upon examining a patient, the patient still merits and should receive from reputable physicians the utmost interest and sympathy for there might be psychological, nervous, or mental factors entering into his condition which are highly important. If physicians ignore those aspects of the patient's problem he is more likely to seek help and treatment from some cultist who might appear to be interested and sympathetic even though he was not qualified to treat disease. Many physicians are now asking their patients whether they have consulted

¹ Delivered October 3, 1928.

members of the cults in the past and what their reasons were for doing so.

Patients are insisting upon greater and greater thoroughness in physical examination and they are alert to the mental attitude of the physician concerning preventive medicine and toward minor illnesses.

The cultists know the scientific benefit resulting from physical examinations and their request for laboratory tests reveal an implied attention to details and to science that is worthy of a better cause.

The intelligent and educated public is in my opinion far more vitally interested and alive to the potentialities of preventive medicine than are many representative physicians, if we are to judge the latter by the crucial test of what they accomplish for disease prevention in their daily work.

Should not a physician feel happy and proud to vaccinate a child successfully against smallpox long before the child reaches the school age? Is there any reasonable excuse for the existence of diphtheria in the children of a physician or other citizen in the year 1928? Is not the lack of imagination and foresight exemplified in the cases of typhoid that one sees scattered in vacation camps, summer resorts and other places where citizens go for pleasure? Few procedures in medicine give me the sense of satisfaction than sending a child or young person to a skilled surgeon, who employs an equally skilled anesthetist for the removal of adenoids and tonsils before these organs become thoroughly infected.

Do we physicians individually devote enough time to an examination of the gums and teeth of our patients' mouths? Can that bugbear pyorrhea be prevented and can it be cured in its early stages? Do we physicians as a professional group make it our business to examine the other members of the family when one member consults us for tuberculosis disease? Is it strange that an intelligent layman should point out that it seemed to him that the

physician in such a case was guilty of malpractice if he did not do so? Is there not need to cultivate the imagination when we see a tuberculous person and prove more useful to the supposed healthy members of the family of the original patient than we sometimes are? Are we physicians as foresighted in dealing with the functional nervous disorders and do we aid both the patient and patient's family to gain an insight into what the disorder really is and that its cure does not lie in medicinal therapy, but in a systematic training of the sympathetic nervous system? Do we take every opportunity that offers with our young patients to teach them to understand and wisely overcome the problems that are so universal in adolescence? Could not we prove to be a little more interested and sympathetic friends to these young people and thus lessen the number that drift into the dangerous hands of charlatans? If each physician did all that he could do to prevent venereal infections could we not reduce the morbidity of such diseases? The opportunity for usefulness in this regard presents itself each day. Let us take advantage of it. We must not forget that although "Science" has helped the medical profession to accomplish much, science and technical skill without a real desire to be useful to our patients and to the world in general will never produce the best type of physician, surgeon or specialist.

FOOD AND FOOD HABITS¹

(Abstract)

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The kind of food a person eats has little or nothing to do with length of life. Life is not entirely a matter of dental caries or of Vitamin A. I am beginning seriously to wonder whether scientific efforts at diet control based

¹ Delivered October 5, 1928.

on animal experiment are not overshooting the mark; whether we are not interpreting the life of a caged white rat rather too seriously for the comfort of a free white man. Of course, I am not arguing against the value of all this work, it is too serious, too important to neglect, too fruitful of possibilities even to criticize, yet man is such a different experimental animal and life is such a different experimenter that you must be cautious about drawing wholesale conclusions from any laboratory data, on length of life of the experimental animal as affected by dietary changes.

On the human side there is some statistical evidence that the span of man's life is increasing slightly; we cannot as yet decide what factor or factors in the complexities of civilization may be responsible. Raymond Pearl is of the opinion, based on biological and statistical studies, that the modern trend in mortality is an expression of an inherited biological tendency, and that environmental factors, such as improvement in food, sanitation, public health care are of secondary importance. But even granting that the tremendous changes involved in modern civilization are of prime importance, we must confess to considerable difficulty in determining which single element in this complex structure is the keynote of the arch of long life.

Millions of dollars and untold acreage are now being invested in golf clubs, Sunday baseball takes many more thousands out in the open, automobiles free the masses from the constant restraint of indoors. Who, as yet, has been able to determine the health factor in all of these things? The truth of the matter probably lies in the special economic status of the toilers; we work harder and more intensively, yet we also earn more and spend more for good food, fresh air, healthy exercise, to form a total of improved conditions.

The mortality trend of most diseases seems to be downhill. Can one implicate food, or food habits in this declining mortality? Typhoid fever is a rarity, the acute in-

fectious diseases gradually are becoming controlled, tuberculosis seems to be yielding to the pressure of concerted preventive efforts. Cardio-vascular diseases and diabetes are perhaps not in the general decline. Both of these diseases will be discussed later. I mention them now merely to illustrate the difficulties encountered when we attempt to evaluate the food factor in modern life.

So far I have discussed the scanty general evidence on hand, and have been led to believe that clinical, experimental and statistic information is lacking to prove any relation between food and length of life. Food and food habits, of course, represent environmental conditions, and running through these statements of mine is the fundamental idea that length of life is a biological phenomenon influenced by many factors of which food is merely a single item. It is not to be inferred that I believe that undernutrition or overnutrition, that violent disobedience of the rules of sane living are to be recommended. These points will be discussed later—at present I wish to urge that biological reasoning is required if any fundamental or scientific basis of our problem is to be obtained. In one study of aged individuals Pearl has found that longevity seems to be a hereditary characteristic, that the best insurance for long life is a parent or parents who have lived a long life. There are animal experiments showing the same trend of reasoning.

In marked contrast to such biological and statistical studies as Pearl's I have been unable to find any comparable research on the effect of food on length of human life. Even McCollom's studies on animals, valuable as they are, cannot be immediately carried into the field of human life, for reasons which I have already discussed. When a writer like Leonard Williams categorically accuses poor cookery as being the sole cause of senile decay, we can smilingly recall that Williams is a raw-food eater, and seriously remember man's tendency to consider his own food fad as a final solution of all food problems.

So I find it exceedingly difficult to continue the discussion except along lines of personal observation and personal deductions. Life insurance actuarial tables offer one interesting fact on longevity. Obese adults are rated up in proportion to the amount of fat they enjoy, which means, of course, that obese persons die at a younger age than persons of normal weight. On the contrary, except when underweight is associated with other findings indicative of disease, it is not a cause for high insurance ratings in adults. It can then probably be stated as a fact that obese individuals have less chance of living long than have thin ones. But does it necessarily follow that obesity connotes evils of eating? Or that early death is a result of the obesity? I do not think that either conclusion is completely justified.

The relation of obesity to overeating is in itself an interesting problem, not yet altogether solved. Let us assume that the laying on of fat *must* result from a disproportion between caloric intake and caloric expenditure; that a given individual puts more fuel in his furnace than he burns up. That does not necessarily imply overeating in the sense of absolute calories, nor does it mean that everyone with the same weight, eating the same food, is going to be fat. It may well mean, as I think it often does, that there is something specific in that individual which slows up his metabolism so that his 1800 calories are not completely oxidized. His neighbor on 2400 calories does not gain weight; surely not all fat persons are heavy eaters as compared to the standards of the day; yet they steadily increase in weight. There are fat families as there are diabetic families; there may be one fat hypophyseal child in an otherwise normal family of children, just as there may be one with congenital heart disease. All of this means that obesity is frequently the expression of an hereditary tendency, rather than evidence of an absolute overindulgence in food. The individual eats more than his metabolic engine can oxidize.

Granted that the obese die young it may be that early death is a parallel rather than a sequential phenomenon

to the obesity. I do not find it difficult to believe that the same inheritance which bestows a slow metabolism may bestow the tendency to early death. This all may sound like quibbling, and the reasoning can not be followed to a conclusion, but actually it is important to our problem. The earlier death of obese individuals is one of the few possible indictments of food or food habits in connection with length of life; it seems possible under the light of searching inquiry, that food habits can be accused merely of being accessories after the fact. Both the obesity and the early death instead of being related as cause and effect may be expressions of an hereditary tendency. Careful reduction of food intake does prevent obesity, but that it definitely increases the span of life in the group of potentially obese is not proved.

Overindulgence immediately brings up the general question of total quantity of food. Overindulgence of almost anything in life to the point of excess brings in its train evil effects on the body. The word "excess," however is a term of comparative values. What is excessive exercise for one man is normal for another; excess food or alcohol for Mr. Jones is a moderate allowance for Mr. Brown.

So far it can be seen that I hold no brief against food and that I believe it probably has little, if anything, to do with length of life.

Little remains to be said about the food of persons who already are old. Again nature plays a role and the factors of safety come into their own. It has been my practice for years to adjust the diet of old persons, sick or well, according to the experiences of their own lives. A man who for 70 years has managed to remain in good health may be expected at that age to have a fairly right idea of what is or is not good for him. Likewise it might reasonably be assumed that theoretical dietary errors which have resulted in no harm have for that particular individual little practical importance. We might also say, as our own study showed, that men and women grow old despite bad feeding and that they quickly adjust themselves to an en-

environment of satisfactory food, and even grow fat. I believe these statements are completely true, and that they can and should also be applied to old persons who are sick.

Years of indiscretions without demonstrable organic damage are not self-condemnatory: the wise physician will not take the imported cigar or the toddy away from a 70-year-old man who has had the habit for 50 years, even if that man suffers from organic heart disease. If he can prove by careful testing that they definitely cause harm he might be justified in such a radical disturbance of the serenity of senescence. But to disturb habits on a basis of theory or tradition is a cruel imposition of a pseudo-scientific attitude on a defenseless person and usually such an attitude can not be justified by the results obtained.

Food or food habits in general play no important role in the attainment of longevity. Unnecessary restriction of food in the aged is usually an unwise and at times a cruel imposition.

Despite much that I read of the evils of the modern way of eating and living, I find in actual practice comparatively few examples of excessive food indulgence to the point of harm. Men overeat, women overeat, but the vogue of the thin and super-thin figure is powerful. And thinness is not compatible with overeating. It certainly is not difficult to conceive of the dangers to the organs which might arise from excessive demands on their vital capacity and probably we have all seen death result directly or indirectly from overeating. Yet, it seems to me that these deaths actually are few and far between.

It is possible to conceive of undernutrition causing more trouble than overeating.

PNEUMONIA IN OLD AGE ¹

(Abstract)

LEWIS K. NEFF,

Director of Medical Service, Harlem Hospital

The dictum that the young get well and the old must die, must be constantly kept in mind and heeded in the treatment of pneumonia of old age.

If treatment is helpful in turning the tide favorably in pneumonia of the early and middle life, it should be so in old age. Assiduous care and close attention are imperative. Frequent visits by the physician are necessary. The patient should be examined often, but without being unduly subjected to exertion or discomfort.

The death rate from pneumonia per 100,000 of the population was 68 between the ages of 45 and 54, 145 between 55 and 64, 234 between 65 and 74, and 441 among people 75 years and over.

The field of usefulness of serum treatment in pneumonia of the aged is greatly limited, as their type of disease is not generally lobar. It is in lobar pneumonia that serums have been used with best results. Alcohol is useful in certain cases.

Given one remedy with which to treat pneumonia in the aged, I would select oxygen. If there was a positive blood culture I would ask for serum and oxygen. If neither were obtainable, I would use digitalis. As all are to be had, I would meet the clinical indications.

TUBERCULOSIS¹

(Abstract)

LAWRASON BROWN

Saranac Lake

Examination of aged persons for symptoms of tuberculosis is important, not only for their good but for the protection of others, especially children in whose care they assist or with whom they are thrown in contact.

Tuberculosis is, in my opinion, due to repeated infections brought about by rather intimate contact with sufferers from the disease. The danger of such infection comes largely from those in whom a diagnosis has not been made. Undiscovered senile tuberculosis is of danger chiefly when its bearer comes into contact with the very young, infants and small children. Every elderly person who cares for babies and children should be repeatedly examined and if they cough or present any symptoms of illbeing, they should be re-examined periodically and frequently. The diagnosis of senile tuberculosis is as difficult as that of childhood tuberculosis. The most modern methods must be employed. Protection of the young should go hand in hand with thoughtfulness for the aged. In any comprehensive scheme for the prevention of tuberculosis provision must be made for those at both extremes of life.

The statistics concerning the frequency of pulmonary tuberculosis in the aged have been revised during the past few decades and consensus of opinion has reverted to the view that tuberculosis is frequent in the aged. A complete routine examination of every old person who cares for children or infants is obligatory.

There are today probably nearly 5,000,000 persons aged 65 years and over in the United States; that is between 4 and 5 per cent. of the population. Probably one out of every 12 dies during the next year which closely approxi-

¹ Delivered October 8, 1928.

mate what happens during the first year of life when one out of every ten dies.

What might be termed the accepted view to-day is that in infancy we are most prone to infection, but with advancing age, this tendency decreases until in old age we become more or less immune to new implantations of the tubercle bacillus, but are never totally free from the danger of a relapse of a previous infection or disease.

Lessened resistance to cold leads many old persons to pass most of their lives in closed rooms, and this, coupled with poor food, chronic alcoholism, diabetes and various respiratory infections, may play an important part in the origin of tuberculous diseases. Annual examinations are no less important for old people than for the younger adults, as in childhood tuberculosis, so in the senile type, the symptoms may be slight or misleading. The search for the bacillus must be painstaking and all the improved methods employed.

The aged are supposed to be more resistant to tuberculosis and the prognosis consequently to be better than among the adults. To-day, however, such a statement is questioned. Age in all probability is more important in prognosis than sex; that is, the older the patient, the better the outlook until the age of 80 years is reached. After this age, the prognosis becomes more uncertain, for a respiratory infection such as febrile bronchitis, pneumonia, influenza or grippe, to which the aged are more prone, may awake a slumbering tuberculosis, which may in turn run a rather acute course.

SYPHILIS IN ELDERLY PERSONS¹

(ABSTRACT)

GEORGE M. MacKEE

Professor of Dermatology and Syphilology,

New York Post-Graduate Medical School and Hospital

Syphilis is one of the most common and one of the most fatal of all serious diseases. Any phase of syphilis is as large as well as an important subject. Syphilis in elderly persons, including old age, middle age and persons approaching middle age, is too comprehensive a subject for detailed consideration. For this reason it is necessary to deal mostly in generalities.

Prevalence of Syphilis: The exact percentage incidence of syphilis is not known. It varies with social status, race, occupation, sex, age, economic conditions, etc., and also in accordance with diagnostic ability, methods and criteria. The prevalence of syphilis in the general population has been placed as high as 40 per cent. by Warthin and as low as 6.5 per cent. by Symmers. These estimates were based on autopsy findings in Michigan and New York respectively. The difference in figures being due probably to the fact that Warthin included a microscopical study, while Symmers depended on gross pathology. Blachko claims that 45 per cent. of the clerks and merchants of Berlin have syphilis. Getz, Lacy, Richie, Lambert and others, basing estimation on gross necropsy findings, provide statistics that agree with those of Symmers, while Stone is higher with 12 per cent.

For the higher social classes, Vedder finds 5 per cent. in private practice. Keidel and Moore also publish 5 per cent. Stokes, at the Mayo Clinic, gives 10.3 per cent. for railroad employees; laborers, 6.9 per cent.; business men, 3.2 per cent.; and farmers 1.4 per cent.

Reviewing all available statistics since those of Fournier, who placed the prevalence of syphilis for the entire

¹ Delivered October 2, 1928.

population of France at 12 to 15 per cent., Stokes considers a conservative estimate is from 7 to 10 per cent. This is in agreement with the careful survey made by the British Royal Commission for the population of the British Empire.

Age Incidence: Syphilis is acquired most frequently in the second decade of life, and the percentage of infections is relatively less with each succeeding decade. On the other hand, the prevalence of syphilis increases from the second to the fourth decade. Stokes and Brehmer placed the highest proportion of positive Wassermann reactions between the ages of 17 and 31. A steady increase is found in the proportion of positive reactions from the age of 11 to 40 years, the peak coming in men in the fourth decade and in women in the second decade. This is followed by a sudden drop, due partly to the fact that the Wassermann tends to become negative in late syphilis and partly because of the greater number of deaths from syphilis and other diseases after the age of 40. The Wassermann is negative in about 13 per cent. of patients with late or tertiary syphilis and in about 30 per cent. of the cases of so-called latent syphilis.

Mortality: Osler once said "that of the killing diseases syphilis comes third or fourth." Later he placed it first on the list. This statement was based on a study of British statistics compiled in 1915. A report from the Industrial Department of the Metropolitan Life Insurance Company tabulating the mortality from syphilis showed that it steadily increased with the age, and reached a peak in the fifth decade. It is impossible to obtain accurate mortality statistics of syphilis because so many deaths are reported as due to conditions such as apoplexy, encephalitis, arteriosclerosis, insanity, heart disease, cirrhosis of the liver, etc., the real cause for many of which is syphilis. Vedder, in his notable public health report states that "syphilis, with the exception of gonorrhea, is the most prevalent of all serious infectious diseases. If statistics as to the incidence of syphilis are vague, figures as to the morbidity and

mortality of syphilis are still more vague. Syphilis appears seldom in death certificates for the family physician most always seeks another title to cover the demise. However, if it be remembered that syphilis is the real cause of death in all cases of paresis, tabes and aortic aneurism, in many cases of cerebral hemorrhage, apoplexy, organic diseases of the heart, liver and kidneys, and that it is a contributory cause of death in many other conditions, including about one-fifth of all cases of pulmonary tuberculosis, the real influence of syphilis on the mortality rate begins to be suspected."

Economic Importance: With the overhead for hospitals, asylums, sanatoria and clinics for the treatment of syphilis and diseases caused by it, must be included financial loss from deaths, total incapacity, interrupted earning power, cost of medical attention and drugs, miscarriages, congenital syphilis, and other items. Stokes believes that the cash cost to the country is five billion dollars annually, and Pollock claims that syphilitic insanity alone costs New York State nearly a half million dollars yearly.

Syphilis in Elderly Persons a Problem of Late Syphilis: The health vicissitudes and infirmities of advancing years complicate the situation to some extent, but it is doubtful if age alone is a very important factor. The serious lesions of late syphilis are not usually clinically manifested until ten, fifteen or more years after the acquisition of the diseases. Therefore, irreparable damage to vital organs is encountered mostly in the fourth and fifth decades.

Syphilis may effect serious damage to any tissue or organ of the body. It is the duty of every physician to be acquainted with at least the principal manifestations of this most protean of all diseases; and, because it can imitate almost any condition, it is advisable to always consider the possibility of syphilis in differential diagnosis.

Among the terrible consequences of syphilis, most of which are preventable by early diagnosis and proper treatment, neurosyphilis probably deserves first place. It includes paresis, paralysis, tabes, encephalitis, etc., and

many affections of the organs of special sense as the eye and ear. The early detection of neurosyphilis is usually possible.

Second in importance is cardiovascular syphilis which includes aortic aneurism, syphilitic myocarditis, endocarditis, arteriosclerosis, and their concomitants. Unlike neurosyphilis, cardiovascular involvement is seldom recognizable until ten, fifteen or more years after infection.

Syphilis of the digestive organs occurs mostly in the third and fourth decades. It may cause ulcer and cancer of the stomach, grave injury to the liver, spleen and other organs.

Cancer of the tongue is a frequent occurrence in syphilitic glossitis and leucoplakia which occur most frequently in the fifth and sixth decades.

Effect of Age on Therapy: It is necessary to provide adequate therapy regardless of the age of the patient. The ability of aged persons and those of middle age to tolerate rigorous treatment is under controversy, but it is probable that the effect of age on therapeutic tolerance has been over emphasized. Elderly persons, provided they are in good health, tolerate intensive treatment with arsphenamine, mercury and bismuth most satisfactorily.

In the early stages of the disease, in the absence of definite contraindications, the patient should receive sterilization treatment, regardless of age. In late syphilis the therapeutic requirements are modified to some extent by the age factor. In the presence of serious active lesions treatment must be instituted. A patient in the fifth, sixth or seventh decade, who has had syphilis for fifteen or more years, requires little if any treatment in the absence of serious activity. On the other hand, a person in the third or fourth decade, whether the disease has been present for a few or many years, must be carefully investigated and receive thoroughly adequate treatment.

Too much reliance must not be placed on one or even several negative Wassermann tests, because this is nega-

tive in from 15 to 30 per cent. of the cases of latent and late syphilis.

Prophylaxis: The incapacitating and fatal affections caused by syphilis take their toll, for the most part, in the fourth and fifth decades, about the time that a person should be at the height of accomplishment. A great deal can be done along the lines of prevention. To obtain the best results syphilis must be diagnosed early and receive adequate treatment in accordance with modern standards. There is no way to positively determine a cure except by inoculation. Every person who has had syphilis should be kept under observation throughout life.

If every physician had a comprehensive knowledge of syphilis and did his full duty in regard to diagnosis, prophylaxis and management, the incidence of the disease would be substantially reduced, and there would be far fewer deaths and very much less incapacity and suffering in the later decades of life.

EXCERPT FROM COUNCIL MINUTES

NOVEMBER 28, 1928

RESOLVED, that the regular Stated Meetings of the Academy shall be held on the evening of the first Thursday of the months of October to May, inclusive, and be it further

RESOLVED, that the Stated Meetings will also be held on the evening of the third Thursday of these months by the Harvey Society or some other society affiliated with the Academy or a society invited by the Program Committee of the Committee on Medical Education, to hold a meeting. Be it also

RESOLVED, that the President and Director are authorized to change these dates when it is to the best interest of the Academy to do so. And be it

RESOLVED, that at these last mentioned meetings no Academy business will be transacted.

RECENT ACCESSIONS TO THE LIBRARY

Acton, H. W. & Knowles, R. On the dysenteries of India.

Calcutta, Thacker, 1928. 178 p.

Adeney, W. E. The principles and practice of the dilution method of sewage disposal.

Cambridge, Univ. pr., 1928. 161 p.

Alexa, E. M. *Contribution à l'étude du bacille paratuberculeux de la fièvre.

Paris, Jouve, 1928. 83 p.

Alexander, H. L. Bronchial asthma. Its diagnosis and treatment. Phil., Lea, 1928. 171 p.

Baker, H. J. Characteristic differences in bright and dull pupils. Bloomington, Ill., Pub. school pub. co. [1927]. 118 p.

Berry, R. J. A. Brain and mind, or, the nervous system of man. N. Y., Macmillan, 1928. 608 p.

Bourne, A. W. Recent advances in obstetrics and gynaecology. 2. ed. Phil., Blakiston, 1928. 382 p.

Broderick, F. W. Dental medicine.

Lond., Heinemann, 1928. 364 p.

- Cameron, W. J. S. Simple surgery at sea.
Glasgow, Brown, 1928. 117 p.
- Chagas, C. On the practice of "terminal" disinfection.
Edinburgh, Hodge, 1928. 45 p.
- Chemical (The) foundation. Chemistry in medicine.
N. Y., Chem. found. [1928]. 757 p.
- Cifuentes, P. & Sáinz de Aja, E. A. *Prácticas de urología y sifiliografía*.
Madrid, Morata, 1927. 533 p.
- Cope, V. Z. The early diagnosis of the acute abdomen.
5. ed. Lond., Milford, 1928. 244 p.
- Crile, G. W. Problems in surgery.
Phil., Saunders, 1928. 171 p.
- Dorchester, F. E. Psycho-physio-kinesiology.
Boston, Christopher, [1928]. 253 p.
- Draper, G. I. Human constitution.... II. The influence of sex in determining human disease potentiality. III. The patient and his physician.
Balt., Williams, 1928. 75 p.
- Duhem, P. Accidents et dangers de l'électricité.
Paris, Gauthier-Villars, 1928. 74 p.
- Duke-Elder, W. S. The practice of refraction.
Phil., Blakiston, 1928. 410 p.
- Dyar, H. G. The mosquitoes of the Americas.
[Wash.], Carnegie Inst. Wash., 1928. 616 p.
- Evans, C. L. Recent advances in physiology.
3. ed. Lond., Churchill, 1928. 403 p.
- Fairbairn, J. S. Gynaecology with obstetrics.
2. ed. Lond., Milford, 1928. 810 p.
- Faithfull, T. J. Plato and the new psychology.
Lond., Bale, 1928. 81 p.
- Fantus, B. Useful cathartics.
2. ed. . . Chic., Amer. med. assoc., [1927]. 139 p.
- Fitch, W. E. The new pocket formulary.
5. ed. Phil., Davis, 1928. 501 p.
- Florence, G. *Contribution chimique à l'étude de la narcose provoquée.
Lyon, Ed. du service photographique de l'Université, 1928. 97 p.
- Fontana, A. Diagnosi e terapia della sifilide e delle malattie veneree.
2. ed. Torino, Unione tip., 1928. 521 p.
- Fraser-Harris, D. Coloured thinking.
Lond., Routledge, 1928. 269 p.
- Freud, S. The future of an illusion.
Lond., Woolf, 1928. 98 p.
- Gougerot, H. Titres et travaux scientifiques. [Dermatologie et syphilis].
Paris, Masson, 1928. 227 p.
- Hartwich, A. Moderne Kosmetik.
2. Aufl. Leip., Konegen, [1927]. 143 p.

- Hartzog, H. S. jr. *Triumphs of medicine.*
N. Y., Doubleday, 1927. 317 p.
- Hauck, L. *Die Behandlung der Geschlechtskrankheiten.*
2. . . Aufl. Leip., Vogel, 1928. 218 p.
- Hawthorne, C. O. *Short essays on medical topics.*
Lond., Bale, 1928. 246 p.
- Hirsch, I. S. *Physikalisch-technische Grundlagen der Röntgentherapie.*
Wien, Springer, 1927. 223 p.
- Hirschfeld, H. *Lehrbuch der Blutkrankheiten.*
2. . . Aufl. Leip., Barth, 1928. 263 p.
- Hofbauer, L. *Asthma.*
Wien, Springer, 1928. 156 p.
- Hübner, A. *Gastroskopie.*
Jena, Fischer, 1928. 80 p.
- Hughes, D. E. *Hughes' practice of medicine including a section on mental diseases and one on diseases of the skin.*
14. ed. Phil., Blakiston, [1928]. 839 p.
- Hutchison, R. *Some principles of diagnosis, prognosis and treatment.*
Bristol, Wright, 1928. 51 p.
- Index (An) of differential diagnosis of main symptoms by various writers.
4. ed. N. Y., Wood, 1928. 1171 p.
- Iselin, M. *Plaies et maladies infectieuses des mains.*
Paris, Masson, 1928. 217 p.
- Isham, M. K. *Cosmos limited.*
N. Y., Neale, 1928. 125 p.
- Jung, C. G. *Two essays on analytical psychology. . .*
Lond., Baillière, 1928. 280 p.
- Kendall, A. I. *Bacteriology.*
3. ed. Phil., Lea, 1928. 733 p.
- Kind (Das); seine körperliche und geistige Pflege. . .
3. Aufl. hrsg. von W. Rein und P. Selter. Stuttgart, Enke, 1927.
576 p.
- Klemperer, G. *Grundriss der klinischen Diagnostik.*
24. Aufl. Berlin, Hirschwald. 334 p.
- Kolmer, J. A. *Serum diagnosis by complement-fixation, with special reference to syphilis. . .*
Phil., Lea, 1928. 583 p.
- Kotzareff, A. & Fischer, R. *Les cancers et la physico-chimie.*
Paris, Vigot, 1927. 336 p.
- Labat, G. *Regional anesthesia. . .*
2. ed. Phil., Saunders, 1928. 567 p.
- Labbé, M. & Nepveux, F. *Acidose et alcalose.*
Paris, Masson, 1928. 295 p.
- Lawrence, R. D. *The diabetic life.*
4. ed. Phil., Blakiston, 1928. 188 p.
- Lévy-Bruhl, L. *L'âme primitive.*
Paris, Alcan, 1927. 451 p.

- Logan, G. B. H. *Masters of crime. Studies of multiple murder.*
Lond., Paul, 1928. 288 p.
- Ludy, R. B. *Answers to questions prescribed by nurses' state boards.*
Phil., McKay, 1928. 498 p.
- Lumière, A. *La vie, la maladie et la mort. Phénomènes colloïdaux.*
Paris, Masson, 1928. 520 p.
- Lusk, G. *The elements of the science of nutrition.*
4. ed. Phil., Saunders, 1928. 844 p.
- Lyon, D. O. *Das periodische System in neuer Anordnung.*
Leip. Deuticke, 1928. 40 p.
- McAdoo, W. G. *The challenge. Liquor and lawlessness versus constitutional government.*
N. Y., Century, [1928]. 305 p.
- McGuigan, H. A. *A text-book of pharmacology and therapeutics.*
Phil., Saunders, 1928. 660 p.
- McKendree, C. A. *Neurological examination.*
Phil., Saunders, 1928. 280 p.
- McKittrick, L. S. & Root, H. F. *Diabetic surgery.*
Phil., Lea, 1928. 269 p.
- Marfan, B. J. A. *Clinique des maladies de la première enfance.*
2. série. Paris, Masson, 1928. 659 p.
- Markey, J. F. *The symbolic process and its integration in children.*
Lond., Paul, 1928. 192 p.
- Massie, G. *Surgical anatomy.*
Lond., Churchill, 1928. 413 p.
- Mignon, A. *Le service de santé pendant la guerre 1914-1918.*
Paris, Masson, 1926-27. 4 v.
- Moore, I. *The tonsils and adenoids and their diseases.*
Lond., Heinemann, 1928. 395 p.
- Mottram, V. H. *Physiology.*
N. Y., Norton, [1928]. 279 p.
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Lond., Seeley, 1928. 218 p.
- Nisot, M. T. *La question eugénique dans les divers pays.*
Bruxelles, van Campenhout, 1927. v. 1.
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Paris, Doin, 1927. 732 p.
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7. ed. Phil., Davis, 1928. 922 p.
- Piney, A. *Diseases of the blood.*
Phil., Blakiston, 1928. 195 p.

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- Proceedings of a Conference on rheumatic diseases, held at Bath, 10th and 11th May, 1928.
[Bath], Hot mineral baths com. Bath city coun. [1928]. 292 p.
- Public health and hygiene in contributions by eminent authors. Edited by W. H. Park.
2. ed. Phil., Lea, 1928. 902 p.
- Read, H. English prose style.
Lond., Bell, 1928. 227 p.
- Reid, W. D. The heart in modern practice.
2. ed. . . Phil., Lippincott, [1928]. 466 p.
- Rickman, J. Index psychoanalyticus. 1893-1926.
Lond., Woolf, 1928. 276 p.
- Robert (The) Jones birthday volume. A collection of surgical essays.
Lond., Milford, 1928. 434 p.
- Rolleston, (Sir) H. D. Cardio-vascular diseases since Harvey's discovery.
Cambridge, Univ. pr., 1928. 149 p.
- Rosell, J. M. Los actuales conocimientos del metabolismo mineral.
Barcelona, Tipografia Emporium, 1927. 129 p.
- Rosell, J. M. & Cambiès, J. Coprologie clinique.
Paris, Vigot, 1927. 239 p.
- St. Andrews (James Mackenzie) institute for clinical research, St. Andrews, Fife. Gastro-intestinal diseases.
Lond., Milford, 1928. 278 p.
- Sands, I. J. Nervous and mental diseases for nurses.
Phil., Saunders, 1928. 239 p.
- Schamberg, J. F. & Kolmer, J. A. Acute infectious diseases.
2. ed. Phil., Lea, 1928. 888 p.
- Scott, G. R. The truth about birth control.
Lond., Laurie, [1928]. 184 p.
- Singer, C. A short history of medicine.
N. Y., Oxford univ. pr., 1928. 368 p.
- Smith, (Sir) F. A history of the Royal army veterinary corps. 1796-1919.
Lond., Baillière, 1927. 268 p.
- Speed, K. A text-book of fractures and dislocations. . .
2. ed. Phil., Lea, 1928. 952 p.
- State charities aid association. N. Y. Directory of welfare agencies in N. Y. state (exclusive of N. Y. C.).
2. ed. . . N. Y., St. char. aid ass'n. [1928]. 266 p.
- Steel, M. Physical chemistry and biophysics for students of biology and medicine.
N. Y., Wiley, 1928. 372 p.
- Talbot, F. Actinotherapy for dental diseases.
Lond., Bale, 1928. 84 p.

- Text-book (A) of surgical diagnosis. Edited by A. J. Walton.
 Lond., Arnold, 1928. 2 v.
 Tomlinson, W. H. The cause and cure of cancer.
 [Lond.], Chalfont, 1928. 32 p.
 Torrance, A. Tracking down the enemies of man.
 N. Y., Sears, [1928]. 300 p.
 Underhill, F. P. Toxicology.
 2. ed. Phil., Blakiston, [1928]. 311 p.
 Vilar Fiol, R. La piorrea alveolar.
 Barcelona, Ed. labor, S. A. 1927. 111 p.
 Walzel, P. Die Technik der Eingriffe am Gallensystem.
 Wien, Springer, 1928. 240 p.
 Wilson, D. W. A laboratory manual of physiological chemistry.
 Balt., Williams, 1928. 272 p.
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PROCEEDINGS OF ACADEMY MEETINGS

NOVEMBER

STATED MEETINGS

Thursday Evening, November 1, at 8:30 o'clock

ORDER

I. EXECUTIVE SESSION

a. Report of the Nominating Committee

Nominations for President for two years; for one Vice-President for three years; two Trustees for five years; three members of the Committee on Admission for three years and one member of the Library Committee for five years.

b. Election of Fellows

II. THE ANNIVERSARY DISCOURSE

"What Medicine Can Do for Law," Benjamin Cardozo, Chief Judge of the Court of Appeals

Saturday Evening, November 24, at 8:30 o'clock

ORDER

I. EXECUTIVE SESSION

II. PAPER OF THE EVENING—SECOND HARVEY LECTURE

The Nature of the Ultraviruses, F. d'Herelle, Professor of Bacteriology, School of Medicine, Yale University

SECTION MEETINGS

SECTION OF SURGERY

Friday Evening, November 2, at 8:30 o'clock

ORDER

I. PAPERS OF THE EVENING

a. Treatment of salpingitis in a general surgical service, Charles E. Farr

- b. The clinical index of malignancy for cancer of the breast, Burton J. Lee, J. G. Stubenbord (by invitation)

II. PRESENTATION OF CASES

SECTION OF DERMATOLOGY AND SYPHILIS

Wednesday Evening, November 7, at 7:45 o'clock

ORDER

I. PRESENTATION OF PATIENTS

- a. Cases of tuberculosis of the skin and the tuberculides
- b. Miscellaneous cases

II. DISCUSSION

III. EXECUTIVE SESSION

Attention is called to the change in date and hour of meeting

SECTION OF PEDIATRICS

Thursday Evening, November 8, at 8:30 o'clock

ORDER

I. PAPERS OF THE EVENING

- a. The Calmette vaccine, its immunizing value in infants and young animals against infection from tuberculosis, William H. Park, Camille Kereszturi (by invitation)
Discussed by Charles Hendee Smith
- b. A study of the blood in infants and young children, Martha Wollstein, Catherine Kriedel, B.A. (by invitation)

II. GENERAL DISCUSSION

SECTION OF OTOTOLOGY

Friday Evening, November 9, at 8:30 o'clock

ORDER

I. READING OF THE MINUTES

II. PRESENTATION OF CASES

III. PAPER OF THE EVENING

Syndrome-complex, Ménière, Dana W. Drury, Boston (by invitation)
Discussion by Randal Hoyt (by invitation)

IV. GENERAL DISCUSSION

V. EXECUTIVE SESSION

Joint Meeting of the

SECTION OF NEUROLOGY AND PSYCHIATRY
and the

NEW YORK NEUROLOGICAL SOCIETY

Tuesday Evening, November 13, at 8:30 o'clock

ORDER

I. READING OF THE MINUTES

II. CASE PRESENTATION

A case of subacute combined sclerosis with benefit from diathermy,
Thomas K. Davis

III. PATHOLOGICAL PRESENTATION

Multiple primary brain tumors (lantern slides), George H. Hyslop
Discussion by Lewis D. Stevenson

IV. PAPERS OF THE EVENING

- a. Ocular changes in encephalitis lethargica, Foster Kennedy
- b. Comments on some contemporaneous descriptions of the muscular system, Walter M. Kraus

SECTION OF ORTHOPEDIC SURGERY

Friday Evening, November 16, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. CASES FOR PRESENTATION
Cases of joint tuberculosis illustrating the paper of the evening,
Edwin Pyle
- III. PAPER OF THE EVENING
Joint Tuberculosis
A study of operative and non-operative treatment of sixty cases from a social and economic aspect, Mather Cleveland, Edwin Pyle
- IV. Discussion by Russell A. Hibbs, Charles Ogilvy, Samuel Kleinberg, Reginal H. Sayre
- V. GENERAL DISCUSSION

SECTION OF OPHTHALMOLOGY

Monday Evening, November 19, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. CLINICAL CASE
Pigment deposits in contraction furrows of iris, Algernon B. Reese
- III. DEMONSTRATION
Pre-retinal artery, an anatomical study, Isadore Goldstein, David Wexler (by invitation)
- IV. PAPERS OF THE EVENING
 - a. A study of the scotoma of amblyopia exanopsia, John N. Evans (by invitation)
Discussion, Luther Peter (by invitation), E. M. Alger.
 - b. Peripheral iridectomy in cataract extraction, Eugene M. Blake
Discussion, Ben Witt Key
- V. EXECUTIVE SESSION

SECTION OF GENITO-URINARY SURGERY

Wednesday, November 21

AFTERNOON PROGRAM

THE MEMORIAL HOSPITAL, 2 West 106th Street

1:30 P.M.

- a. Suprapubic cystotomy with use of radon implants for carcinoma of the bladder
- b. Conservative amputation of penis

- c. Orchidectomy for teratoma testis, Benjamin S. Barringer, Archie L. Dean, Jr.
- d. Relation between structure and radiosensitivity of bladder tumors, Max Cutler
- e. Studies of the spermatogenic function after irradiation of teratoid tumors of the testis, John Toole
- f. Demonstration of congenital anomalies of the genito-urinary organs, Halsey J. Bagg

THE FIFTH AVENUE HOSPITAL
Fifth Avenue and 106th Street

4:00 P.M.

- a. Demonstration of equipment and new cystoscopic devices, Sprague Carleton
- b. Suprapubic prostatectomy—spinal anesthesia—a device for the control of hemorrhage, Benjamin S. Barringer
- c. Two unusual cases of kidney disease, Archie L. Dean, Jr.

EVENING PROGRAM
THE NEW YORK ACADEMY OF MEDICINE
at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. PRESENTATION OF CASES
 - a. Teratoma testis with metastases controlled by irradiation, 3 cases, Archie L. Dean, Jr.
 - b. Inoperable infiltrating carcinoma of the bladder controlled seven years by radon implants, 2 cases
 - c. Carcinoma of the prostate controlled six years by interstitial irradiation, Benjamin S. Barringer
- III. PAPERS OF THE EVENING
 - a. Experimental production of epithelial hyperplasia in the kidney pelvis, George T. Pack (by invitation)
 - b. Carcinoma of the prostate: a correlation of pathology and clinical results in 30 cases, John Toole (by invitation)
 - c. An embryological study of congenital anomalies of the kidney, Halsey J. Bagg (by invitation)
 - d. The symptoms and early diagnosis of carcinoma of the genito-urinary organs, Archie L. Dean, Jr.
 - e. Three cases of benign hypertrophy of the prostate relieved by high voltage roentgen ray, Benjamin S. Barringer

SECTION OF OBSTETRICS AND GYNECOLOGY

Tuesday Evening, November 27, at 8:30 o'clock

ORDER

- I. READING OF THE MINUTES
- II. PRESENTATION OF CASES

- a. Urethral angioma in the female, J. Sydney Ritter, Irving Rattner
(by invitation)

Discussion by Leo Buerger

- b. Toxemia of pregnancy and accidental hemorrhage with autopsy
specimens, Julius Kurzrock

Discussion by Frederick A. Kassebohm (by invitation), George W.
Kosmak, Frederick W. Rice

III. PAPERS OF THE EVENING

- a. Primary carcinoma of the fallopian tube, Harbeck Halsted
Discussion by William P. Healy, William Edgar Caldwell

- b. The histogenesis of adeno-myositis, Gerard Ludwig Moench
Discussion by Robert Tilden Frank, Paul Klemperer, Alfred Plaut

IV. GENERAL DISCUSSION

V. EXECUTIVE SESSION

Joint Meeting of the
SECTION OF LARYNGOLOGY AND RHINOLOGY
and the
SECTION OF MEDICINE

Wednesday Evening, November 28, at 8:30 o'clock

ORDER

I. READING OF THE MINUTES

II. PAPERS OF THE EVENING

Symposium on diagnosis and treatment of lung abscess

- a. Medical diagnosis, James Alexander Miller

- b. Roentgenologic diagnosis, Leon Theodore LeWald

- c. Bronchoscopic diagnosis and treatment, Sidney Yankauer

- d. Surgical diagnosis and treatment, Adrian V. S. Lambert

Discussion by C. J. Imperatori, John D. Kernan

III. GENERAL DISCUSSION

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FELLOWS ELECTED NOVEMBER 1, 1928

Bernard B. Berkowitz.....	225 Eastern Parkway, Brooklyn
Joseph George Wishner.....	680 West End Avenue
Arthur Weil.....	Northwestern University, Chicago
Kingsley Roberts.....	101 West 57th Street
Harry Aaron Solomon.....	1150 Fifth Avenue
Harry DuBois Goetchius.....	11 East 68th Street
Kirby A. Martin.....	6 East 85th Street
Robert Bush McGraw.....	105 East 38th Street
Samuel Silbert.....	55 East 86th Street
David Warshaw.....	375 State Street, Albany

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STATED MEETINGS

1st and 3rd Thursdays.

SECTION MEETINGS

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Surgery, 1st Friday.

Neurology and Psychiatry, 2nd Tuesday.

Pediatrics, 2nd Thursday.

Otology, 2nd Friday.

Ophthalmology, 3rd Monday.

Medicine, 3rd Tuesday.

Genito-Urinary Surgery, 3rd Wednesday.

Orthopedic Surgery, 3rd Friday.

Obstetrics and Gynecology, 4th Tuesday.

Laryngology and Rhinology, 4th Wednesday.

Historical and Cultural Medicine, 4th Friday of October, December, February and April.

TRUSTEES, COUNCIL AND COMMITTEE MEETINGS

Trustees, 4th Wednesday.

Council, 4th Wednesday.

Committee on Admission, 1st Wednesday.

Committee on Library, 2nd Tuesday.

Public Health Relations Committee, Mondays.

Committee on Medical Education, 2nd Thursday.

Committee on International Medical Relations, 3rd Wednesday.

DONATIONS TO THE LIBRARY FUNDS

Donations and bequests are solicited by The New York Academy of Medicine for the maintenance and expansion of the Library.

A donation or bequest of \$5,000 or more will provide for a special library fund, the income of which may be used for the general purposes of the Library or restricted to the purchase of books and periodicals, as the donor or testator may indicate.

ANNOUNCEMENT

A simple luncheon is now being served on the sixth floor to the Academy staff.

The House Committee has agreed to have luncheons served in the reception room to Fellows of the Academy. Any Fellow desiring luncheon should notify the Academy telephone operator not later than 11 A. M.

DEATHS OF FELLOWS OF THE ACADEMY

CHESTER FORD DURYEA, M.D., 784 Carroll Street, Brooklyn, New York; graduated in medicine from the Jefferson Medical College, Philadelphia, in 1901; elected a Fellow of the Academy November 1, 1923; died November 7, 1928. Dr. Duryea was a Fellow of the American Medical Association, a Fellow of the American College of Physicians, a member of the American Radium Society, a member of the Kings County Hospital Alumni Club, Consulting Radium-Therapist to Wyckoff Heights Hospital, Radium-Therapist to Kings County, Unity and Caledon Hospitals.

ANTONIO FANONI, M.D., 119 West 11th Street, New York City; graduated in medicine from the College of Naples, Italy, in 1893; elected a Fellow of the Academy February 1, 1906; died November 3, 1928. Dr. Fanoni was a Fellow of the American Medical Association, a Fellow of the American College of Surgeons and Consulting Surgeon to the Italian Hospital.

BULLETIN
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INDEX

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